

Notes on the genus *Thoressa* SWINHOE, [1913] from China, with the description of a new species (Lepidoptera, Hesperidae)

by

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Abstract: A checklist of species and subspecies of the genus *Thoressa* SWINHOE, [1913] is given. The type specimens of *Thoressa zinnia* (EVANS, 1939) and *Thoressa pedla* (EVANS, 1955) are illustrated for the first time. *Thoressa hishikawai* YOSHINO, 2003 is considered as a new junior synonym of *Thoressa pedla* (EVANS, 1955). *Halpe fusca senna* EVANS, 1937 is considered as a new junior synonym of *Thoressa fusca caenis* (LEECH, 1893). *Thoressa masuriensis cuneomaculata* MURAYAMA, 1995 is considered as a new junior synonym of *Thoressa masuriensis tali* (SWINHOE, 1912). *Pedesta naumanni* HUANG, 1998 is considered as a new junior synonym of *Thoressa hyrie* (DE NICEVILLE, 1891). The type specimen of *Halpe lucasi merea* EVANS, 1932 is illustrated for the first time and proved to belong in *Thoressa hyrie* (DE NICEVILLE, 1891). Finally, a new species, *Thoressa yingqii* **spec. nov.**, from Shaanxi Province of Central China is described.

Introduction: The author has finished a taxonomic review of the tribe Aeromachini TUTT, 1906 (sensu WARREN & al. 2008) from China, and presents the taxonomic changes within the genus *Thoressa* SWINHOE, [1913] in this paper. More results of the review will be published separately.

Abbreviations:

BMNH: Natural History Museum, London.

BSNU: Biological laboratory of Shanghai Normal University, Shanghai, China.

CCAM: Collection of An-Ming Chen, Wuhan, China.

CCZB: Collection of Zhi-Bing Chen, Shanghai, China.

CHH: Collection of Hao Huang, Qingdao, China.

EMNW: Entomological Museum, Northwest Sci-Tech University of Agriculture and Forestry, Yangling, Shaanxi, China.

IZAS: Institute of Zoology, Chinese Academy of Science, Beijing, China.

LBMJ: Lake Biwa Museum, Japan.

QVTC: Qingdao Vocational and Technical College, Qingdao, China.

TL: Type locality.

ZMHB: Museum für Naturkunde, Humboldt Universität, Berlin.

Synonymic checklist of species and subspecies of *Thoressa* SWINHOE, [1913]

1. *Thoressa aina* (DE NICEVILLE, 1889) (original generic name: *Halpe*) (TL: Sikkim) - Sikkim, Northwest India (Garhwal).
2. *Thoressa astigmata* (SWINHOE, 1890) (*Parnara*) (TL: Nilgiris, South India) - South India.
3. *Thoressa baileyi* (SOUTH, 1914) (*Halpe*) (TL: Mengong, Yunnan) - Southwest China (North Yunnan, West Sichuan).
= *Pedesta baileyi nanka* EVANS, 1949 (synonymised by HUANG & ZHAN, 2004) (TL: Wushi, Sichuan).
= *Thoressa dianchiana* MURAYAMA, 1995 (synonymised by HUANG & ZHAN, 2004) (TL: Tuguancun, North Yunnan).
4. *Thoressa bivitta* (OBERTHÜR, 1886) (*Pamphila*) (TL: Tatsienlou, Sichuan) - China (West Sichuan, North Yunnan).
= *Pamphila albivitta* (OBERTHÜR, 1886) (incorrect subsequent spelling).
5. *Thoressa blanchardii blanchardii* (MABILLE, 1876) (*Hesperilla*) (TL: Mupin, Sichuan) - China (West Sichuan).
Thoressa blanchardii shensia (EVANS, 1949) (*Pedesta*) (TL: Tapai Shan, Shaanxi) - China (Shaanxi, Northeast Sichuan).
= *Thoressa abprojecta* WANG & YUAN, 2003 (synonymised by HUANG & ZHAN, 2004) (TL: Qinling, Shaanxi).
6. *Thoressa cerata* (HEWITSON, 1876) (*Hesperia*) (TL: Sikkim) - Sikkim, Northeast India (Assam), Myanmar, Thailand, Laos, Vietnam.
7. *Thoressa decorata* (MOORE, [1881]) (*Halpe*) (TL: Ceylon) - Sri Lanka.
8. *Thoressa evershedi* (EVANS, 1910) (*Halpe*) (TL: Palni Hills, South India) - South India (Nilgiris, Animalai Hills, Palni Hills, Travancore).
= *Thoressa cochina* (EVANS, 1932) (*Halpe*) (synonymised by EVANS, 1949) (TL: Animalai Hills, South India).
9. *Thoressa fusca fusca* (ELWES, [1893]) (*Halpe*) (TL: Bernardmyo, Burma) - N Myanmar, SW China (Dulong valley of Yunnan, SE Tibet), Laos, Vietnam.
Thoressa fusca caenis (LEECH, 1893) (*Halpe*) (TL: Chiakouho, Sichuan) - West China (Yunnan except Dulong valley, Sichuan).
= *Thoressa fusca senna* (EVANS, 1937) (*Halpe*) (TL: Siaolou, Sichuan) **syn. nov.**
= *Thoressa breviprojecta* YUAN & WANG, 2003 (synonymised by HUANG & ZHAN, 2004) (TL: Lushan, Sichuan).
Thoressa fusca debilis (ELWES & EDWARDS, 1897) (*Halpe*) (TL: Khasia Hills, NE India) - NE India.
Thoressa fusca strona EVANS, 1949 (TL: Kuatun, Fujian) - Southeast China (Fujian, Guangdong).
10. *Thoressa gupta gupta* (DE NICEVILLE, 1886) (*Halpe*) (TL: Sikkim) - Sikkim, N.W. India (Garhwal), China (Dulong valley of Yunnan).
Thoressa gupta leechii (EVANS, 1932) (*Halpe*) (TL: Wassukow, Sichuan) - China (Sichuan, Guangdong).
Thoressa gupta nujiangensis HUANG, 2003 (TL: Nujiang, Yunnan) - China (Nujiang valley and Gaoligongshan Mts. of Yunnan).
Thoressa gupta ssp. (TL: Qinling, Shaanxi) - China (South Shaanxi, Northeast Sichuan).
11. *Thoressa honorie* (DE NICEVILLE, 1887) (*Halpe*) (TL: Palni Hills) - South India.
12. *Thoressa hyrie* (DE NICEVILLE, 1891) (*Halpe*) (TL: Naga Hills, Northeast India) - Northeast India, Southeast Tibet, Bhutan, Thailand, North Myanmar, Laos, Vietnam.
= *Halpe lucasi merea* EVANS, 1932 (synonymised by EVANS, 1949) (TL: Pemako, Mere, Southeast Tibet, now Metok).
= *Pedesta naumanni* Huang, 1998 (TL: Metok, Southeast Tibet) **syn. nov.**
13. *Thoressa justini justini* INOUE, 1970 (TL: North Luzon) - Philippines (North Luzon).
= *Halpe nuydai* MURAYAMA & OKAMURA 1973 (synonymised by KAWAZOE, 1973) (TL: Luzon).

- Thoressa justini raphaeli* NUYDA & KITAMURA, 1994 (TL: Leyte) - Philippines (Leyte).
14. *Thoressa kuata* (EVANS, 1940) (*Halpe*) (TL: Kuantun, Fujian) - Southeast China (Fujian, Zhejiang).
15. *Thoressa latris* (LEECH, 1893) (*Halpe*) (TL: Tatsienlou, Sichuan) - Southwest China (Sichuan, Yunnan).
16. *Thoressa luanchuanensis* (WANG & NIU, 2002) (*Ampittia*) (TL: Luanchuan, Henan) - Central China (Henan, Hubei).
= *Thoressa nakai* YOSHINO, 2003 (synonymised by HUANG & ZHAN, 2004) (TL: Shennongjia, Hubei).
17. *Thoressa masoni* (MOORE, [1879]) (*Pamphila*) (TL: Upper Tenasserim, Burma) - Myanmar, Thailand, NE India (Manipur), Vietnam, Laos.
18. *Thoressa masuriensis masuriensis* (MOORE, 1878) (*Isoteinon*) (TL: Mussoorie, Northwest India) - Northwest India (Kulu-Kumaon), Northeast India (Assam), Sikkim, Laos.
Thoressa masuriensis tali (SWINHOE, 1912) (*Pedestes*) (TL: Haut Yunnan) - West China (North Yunnan, West Sichuan).
= *Thoressa masuriensis cuneomaculata* MURAYAMA, 1995. (TL: Yunnan) **syn. nov.**
19. *Thoressa monastyrskiyi monastyrskiyi* DEVYATKIN, 1996 (TL: North Vietnam) - North & Central Vietnam.
Thoressa monastyrskiyi annamita DEVYATKIN & MONASTYRSKII, 1999 (TL: Central Vietnam) - Central Vietnam.
20. *Thoressa panda* (EVANS, 1937) (*Pedesta*) (TL: Naga Hills, Northeast India) - Northeast India (Naga Hills, Manipur).
21. *Thoressa pandita* (DE NICEVILLE, 1885) (*Isoteinon*) (TL: Sikkim) - Sikkim, Northeast India (Naga Hills), North Myanmar, North Vietnam, Southwest China (Yunnan, Southeast Tibet).
= *Thoressa nanshaona* MURAYAMA, 1995 (TL: Tengchong, Yunnan) **syn. nov.**
22. *Thoressa pedla* (EVANS, 1955) (*Pedestes*) (TL: Yunnan) - China (Yunnan).
= *Pedesta hishikawai* YOSHINO, 2003 (TL: Zhongdian, Northwest Yunnan) **syn. nov.**
23. *Thoressa serena* (EVANS, 1937) (*Halpe*) (TL: Tatsienlou, Sichuan) - China (Sichuan, Yunnan), Northeast Myanmar, Vietnam.
24. *Thoressa similissima* DEVYATKIN, 2002 (TL: North Vietnam) - North & Central Vietnam.
25. *Thoressa sitala* (DE NICEVILLE, 1885) (*Halpe*) (TL: Nilgiris, South India) - South India.
26. *Thoressa submacula* (LEECH, 1890) (*Halpe*) (TL: Changyang, Hubei, Central China) - China (Hubei, Zhejiang, Fujian, Anhui, Guangdong), North Vietnam.
= *Thoressa submacula rubella* DEVYATKIN, 1996 (possible synonym) (TL: North Vietnam).
27. *Thoressa thandaunga* (EVANS, 1926) (*Halpe*) (TL: Karen Hills, Buma) - Myanmar (Karen Hills, Htawgaw).
28. *Thoressa varia varia* (MURRAY, 1875) (*Pamphila*) (TL: Japan) - Japan.
= *Halpe melancholica* BRYK, 1942 (synonymised by EVANS, 1949) (TL: Tomari, Kurile Islands).
= *Halpe varia obscura* NAKAHARA, 1951 (synonym?) (TL: Shimashima, Shinano Province, Japan).
Thoressa varia horishana (MATSUMURA, 1910) (*Halpe*) (TL: Formosa) - Taiwan.
= *Halpe aokii* MATSUMURA, 1934 (synonymised by EVANS, 1949) (TL: Formosa).
= *Halpe ara* FRUHSTORFER, 1911 (synonymised by EVANS, 1949) (TL: Formosa).
= *Halpe formosa* SEITZ, 1926 (nom. nud.) (TL: not mentioned).
29. *Thoressa viridis* (HUANG, 2003) (*Pedesta*) (TL: Upper Nujiang Valley, Northwest Yunnan) - China (Northwest Yunnan: Upper Nujiang, Upper Lancang valley).
30. *Thoressa xiaoqingae* HUANG & ZHAN, 2004 (TL: Guangdong) - Guangdong, Hainan.
31. *Thoressa yingqii spec. nov.* (TL: Houzhenzi, Qinling, Shaanxi) - Central China (Shaanxi).
32. *Thoressa zinnia* (EVANS, 1939) (*Halpe*) (TL: Likang, Yunnan) - North Yunnan (Lijiang area).

***Thoressa yingqii spec. nov.* (fig. 1)**

Holotype (= HT) ♂ (BSNU): China, Shaanxi Province, Zhouzhi County, Houzhenzi Township, south slope of Mt. Taibai-shan, 1300 m, V.2007, local collector.

Description: Length of forewing 15mm. Antenna with 13 orange nudum antennomeres at apex, 10 in apiculus and 3 before apiculus. Antennal club without pale patch before apiculus. Apiculus of antenna slender. Male brand only appeared on upperside of forewing, continued from dorsum to base of space 2, closer to wing-base than to termen at vein 2A, associated with yellow and gray scales. Ciliae mostly destroyed. Upperside. Forewing. Vein 2A a little distorted upwards at ♂ brand, but no so strong as in *Th. baileyi* (SOUTH). Vein Cu2 distorted upwards at base, but not so strong as in *Th. blanchardii* (MAB.). Ground color brown and sparsely clad with yellow scales. Discal spots in spaces 2 and 3 very small and separated widely, both smaller than subapical spots. All spots pure white in color. Cell spots paired but separated. Hindwing brown and clad with yellow scales, unmarked. Underside. Forewing paler than on upperside, with all pale spots repeated. Hindwing densely clad with yellow scales, without any clear markings (probably due to the worn-out condition of the specimen).

♂ **genitalia:** Uncus bifid, with two branches widely separated and finger-shaped at tip. Tegumen expanding a little laterally but without lateral processes. Gnathos paired and not expanding laterally. Left footstalk of valva very short but right footstalk of valva very long, nearly four times as long as left one, oblong and serrate at posterior margin. Left valva similar to right valva in shape but not the same, both with two branches, an upper one and a distal one, like in *Th. blanchardii* (MAB.). Juxta like in *Th. latris* (LEECH) and *Th. xiaoqingae* HUANG & ZHAN. Aedeagus like in *Th. latris* (LEECH) and *Th. xiaoqingae* HUANG & ZHAN, but a little longer. Coecum penis expanding laterally. Cornuti absent.

Diagnosis: This new species can be distinguished from all the known species by the following combination of characters: 1) forewing discal spots smaller than subapical spots; 2) left footstalk of ♂ valva very short but the right footstalk of ♂ valva nearly four times as long as the left one.

This new species is in common with *Th. latris* (LEECH) and *Th. xiaoqingae* HUANG & ZHAN in the structures of tegumen, uncus, gnathos, juxta and aedeagus, but differs markedly from both of them in shape of valva and harpe. This new species is sympatric with *Th. blanchardii shensia* (EVANS), but differs from the latter not only in wing-markings and ♂ genitalia, but also in venation and antenna; the vein 2A of forewing is distorted upwards in *Th. yingqii spec. nov.* but is rather straight in *Th. blanchardii* (MAB.), the base of the vein Cu2 of forewing is much more distorted upwards in *Th. blanchardii* (MAB.) than in *Th. yingqii spec. nov.*, the apiculus of antenna is markedly longer in *Th. yingqii spec. nov.* than in *Th. blanchardii* (MAB.).

Distribution: Shaanxi (south slope of Mt. Taibaishan).

Taxonomic notes

Thoressa fusca caenis (LEECH, 1893)

Halpe caenis LEECH, 1894: 625, plate 42: 16, type ♂, Chiakouho (Jinkouhe), Sichuan (BMNH); ELWES & EDWARDS (1897: 262); MABILLE (1909: 350, plate 89g ♂).

Halpe fusca senna EVANS, 1937: Siaoou (near Baoxing area, Sichuan) (BMNH) **syn. nov.**

Thoressa fusca caenis, EVANS (1949: 256, Chiakouho); HUANG & ZHAN (2004: 182).

Thoressa fusca senna, EVANS [1949: 256, plate 5: G11-16 ♂, Tatsienlou area (Kangding)].

Thoressa breviprojecta Yuan & Wang, 2003: 64, 65, figs. 2A for ♂, figs. 2B, 2C, 2D, 2E for ♂ genitalia, HT ♂, Lushan, Sichuan (EMNW). Synonymised by HUANG & ZHAN (2004).

Specimens examined: China, Sichuan Province: 15 ♂♂ (CCZB), Baoxing County, Ziyun Village, V.2008, local collector leg..

Length of forewing: 15-16mm (♂).

Remarks: Both *Halpe caenis* LEECH and *Halpe fusca senna* EVANS were described from western Sichuan and their type localities are very close. EVANS (1949) treated them as two different subspecies of a single species and stated that the only difference is the presence or absence of the cell spots on upperside of forewing. EVANS only examined very few specimens from Sichuan and knew little about the Chinese geography. The authors examined 15 specimens from the type locality of *H. fusca senna* EVANS and found that the cell spots can be present or absent. The type locality of *H. caenis* LEECH, the Jinkouhe area is just to the southeast of the Baoxing area and there is no difference in butterfly fauna between the two adjacent areas. Thus *Halpe fusca senna* EVANS, 1937 **syn. nov.** is considered as a new junior synonym of *Halpe caenis* LEECH, 1893 in this paper. Moreover, the presence or absence of cell spots is also individually variable among the population of *Thoressa fusca fusca* (ELWES) from southeastern Tibet.

Distribution: Sichuan (Baoxing, Kangding, Emeishan), Yunnan (Dali, Nujiang).

Thoressa hyrie (DE NICEVILLE, 1891)

Halpe hyrie DE NICEVILLE, 1891: 388, plate G: 34, type ♂, Naga Hills (NE India) (Depository unknown, probably Indian Museum, Chowringhee, Calcutta?); ELWES & EDWARDS (1897: 258).

Halpe lucasi (sic) *merea* EVANS, 1932: HT ♂, Pemako, Mere, S.E. Thibet (now Metok, Southeast Tibet) (BMNH). Synonymised by EVANS (1949).

Thoressa hyrie, EVANS [1949: 253, plate 32: G11-4 ♂ genitalia. Bhutan, Manipur and Naga Hills (NE India), Sadon of N. Burma (Myanmar), N. Shan State (Myanmar), S.E. Thibet]; KIMURA (1997: 47, plate 1: 3, 4 ♂, Thailand); OSADA & al. (1999: plate 137 ♂ from Xiang Khouang, Laos); MONASTYRSKII & DEVYATKIN (2003: 46, North and Central Vietnam).

Pedesta naumanni HUANG, 1998: 211, fig. 1a for ♂ genitalia, colour plate 1: 1a, 1b, 2a, 2b ♂, HT ♂, Arniqiao, Metok, Southeast Tibet (QVTC) **syn. nov.**

Specimens examined: China, Tibet: 1 ♂ (BMNH, HT of *Halpe lucasi merea* EVANS, photos examined), Pemako, Mere (now Motuo County, Miri Village), 7.VI.1913, BAILEY & MORSHEAD leg.; 2 ♂♂ (CHH, HT and paratype (= PT) of *Pedesta naumanni* HUANG), Motuo County, Arniqiao, 23.VII.1996, H. HUANG leg.. Southern China: 2 ♂♂ (CCZB), no label.

Length of forewing: 16 mm (♂).

Remarks: 1) *Halpe lucasi* (sic) *merea* was treated by EVANS (1949) as a synonym of *Halpe hyrie*, but the type material of *Halpe lucasi* (sic) *merea* has never been illustrated. Because there is a *Sovia* species close to *Sovia lucasii* found at the type locality of *Halpe lucasi* (sic) *merea*, it is necessary to examine the HT of *Halpe lucasi* (sic) *merea*. The author examined the photos of the HT of *Halpe lucasi* (sic) *merea* and confirmed EVANS' (1949) conclusion that *Halpe lucasi* (sic) *merea* EVANS is a synonym of *Th. hyrie* (DE NICEVILLE), not a species of *Sovia*.

2). *Pedesta naumanni* HUANG is proved to be the same as *Halpe lucasi* (sic) *merea* EVANS and considered as a new junior synonym of *Th. hyrie* (DE NICEVILLE, 1891).

3) This species is rather variable in ♂ brand on upperside of forewing and the presence or absence of the black spots on underside of hindwing. The authors examined two specimens from some part of southern China and found they may represent a different subspecies, but the known specimens are not enough and no detailed locality is known.

Distribution: Tibet (Motuo), some part of southern China; northeastern India, Bhutan, Myanmar, Thailand, Laos, Vietnam.

Thoressa pandita (DE NICEVILLE, 1885)

Isoeteon pandita DE NICEVILLE, 1885: 121, plate II: 14 ♀, type ♀, Sikkim.

Pedestes pandita, ELWES & EDWARDS (1897: 193, plate 24: 41, 41a, 41b for ♂ genitalia. Sikkim, Naga Hills).

Pedesta pandita, EVANS [1949: 249, plate 31: G9-3 for ♂ genitalia. Sikkim, Naga Hills (NE India), North Burma to North Shan State (Myanmar), Tonkin (N Vietnam)]; HUANG (1998: 213: 1b for ♂ genitalia); HUANG (2003: 25, fig. 34 for ♂ genitalia, plate 3: 3 ♂, Metok, SE Tibet); MONASTYRSKII & DEVYATKIN (2003: 46, North Vietnam).

Thoressa nanshaona MURAYAMA, 1995: 33, figs. 14,16, HT ♂, „Tuguancun“ (HT actually labeled from Tengchong), Yunnan (LBMJ); HUANG & ZHAN (2004: 180, 183, fig. 2 for ♂ genitalia taken from HT of *Th. nanshaona*, colour plate 12b: 1, 2 for HT ♂) **syn. nov.**

Thoressa pandita, HUANG & ZHAN (2004: 180).

Specimens examined: China: 3 ♂♂ (CHH), Tibet, Motuo County, Arniqiao, 11.VII.1996 & 12.VIII.2005, H. HUANG leg.; 2 ♂♂ (CHH), Yunnan Province, Baoshan City, Tengchong County, Datang Village, 13.VI.2005; 1 ♂ (LBMJ, HT of *T. nanshaona*), Tengchong, 24.IV.1995; 3 ♂♂ (CHH), Baoshan City, Baihualing Nature Reserve, 23.V.2005, H. HUANG leg..

Length of forewing: 13-14.5 mm (♂).

Remarks: The HT of *Th. nanshaona* MURAYAMA has been dissected (HUANG & ZHAN, 2004) and its ♂ genitalia are in common with the specimens of *Th. pandita* (DE NICEVILLE) from southeastern Tibet. The authors collected more specimens from the area around the type locality of *Th. nanshaona* MURAYAMA and found that this species is rather variable in shape of forewing, the size and shape of discal spots on upperside of forewing, the shape of cell spots, and the presence or absence of pale markings on underside of hindwing. All the specimens examined have been dissected and they all belong in a single species. Thus the author considers *Thoressa*

nanshaona MURAYAMA, 1995 **syn. nov.** as a new junior synonym of *Isoteinon pandita* DE NICEVILLE, 1885.

Distribution: Yunnan (Gaoligongshan Mts.), Tibet (Motuo); Sikkim, northeastern India, Myanmar, Vietnam.

Thoressa pedla* (EVANS, 1955) **comb. nov.*

Pedestes pedla EVANS, 1955: 751. Yunnan (BMNH).

Pedesta hishikawai YOSHINO, 2003: 9, figs. 25, 27 for ♂, fig. 37 for ♂ genitalia, HT ♂, Zhongdian, North Yunnan (MNHA) **syn. nov.**
Thoressa hishikawai, HUANG & ZHAN (2004: 180).

Specimens examined: China: Yunnan Province: 1 ♂ (BMNH, HT, photos examined), no detailed locality, 1918, G. FORREST leg.; 2 ♂♂, 1 ♀ (CCAM), Lijiang, Mt. Yulongxueshan, 28.IV.1995, A.-M. CHEN leg.; 1 ♂ (CCAM), Zhongdian, 4.VII.1995, A.-M. CHEN leg..

Length of forewing: 12mm (♂ and ♀).

Distribution: Yunnan (Zhongdian, Lijiang).

Remarks: 1) EVANS (1955) described this species on a single ♂ and pointed out that the footstalk of ♂ genitalia is absent, however all the newly collected specimens have the footstalk well marked. The authors sent the photos of ♂ genitalia dissected from the newly collected specimens to Mr. JOHN CHAINEY, BMNH for a comparative study with the HT, and was told that they share the same ♂ genital characters with the HT. Therefore the absence of the footstalk in HT was due to a damage of specimen.

2) *Pedesta hishikawai* YOSHINO, 2003 **syn. nov.** is considered as a junior synonym of *Pedestes pedla* EVANS, 1955. YOSHINO (2003) overlooked the description of *P. pedla* EVANS when he described *P. hishikawai* YOSHINO. The specimens examined by the authors share the same wing characters with the type material of *P. hishikawai* YOSHINO, their ♂ genitalia were confirmed to be the same as the HT of *P. pedla* EVANS by Mr. JOHN CHAINEY.

3) This species is rather variable in appearance of wing markings. In normal form the discal spots in spaces 2-3 of forewing are absent and the pale longitudinal discal stripe is well marked. However the discal spots of forewing can be well marked or obscure. In HT of *Pedestes pedla* EVANS, the underside of hindwing without a clear pale longitudinal discal stripe but with the discal area markedly paler than costal and anal areas, and with some irregular dark smudges; such irregular smudges are also found in one of the three specimens of *Th. zinnia* (EVANS) examined and a few specimens of *Th. baileyi* (SOUTH) from the same area in Yunnan and seem not to be a constant character for species of *Thoressa* from Yunnan. The most important diagnostic characters found in either HT or the newly collected specimens include: size smaller than in all other species, with a length of forewing around 12mm in all known specimens; all ciliae on upperside of both wings uniform gray; all ciliae on underside of both wings uniform pale yellow and not mixed with dark colouring; the ♂ brand on upperside of forewing mixed only with dark and gray scales, not associated with pale yellow or whitish scales, closer to wing-base than to termen at vein 2A; discal area on underside of hindwing paler than costal and anal areas; Uncus with two branches pointed inwards and rather sharp at tip, and with a central split on dorsal surface; gnathos paired and expanding laterally and beyond the uncus in dorsal or ventral view; both valvae simple and nearly symmetric, with harpe stout and rounded, not branched; aedeagus with coecum penis expanding laterally and without cornuti. The important characters found in the newly collected specimens but damaged in HT include: antennal club without pale scales before apiculus; both left and right footstalks of male genitalia simple in structure, single pointed and smooth on outer margin.

4) The ♂ and ♀ genitalia are illustrated herein (figs. 18, 19).

***Thoressa masuriensis tali* (SWINHÖE, 1912)**

Pedestes masuriensis tali SWINHÖE, 1912: 149, type ♂, Haut Yunnan (BMNH).

Pedesta masuriensis tali, EVANS [1949: 249, plate 4: G9-1 ♂, Tali (Dali, N Yunnan), Bahand (Baihanluo, Upper Nujiang valley, NW Yunnan), Tatsienlou (Kangding, W Sichuan), Taytouho (Daduhe, Luding area, W Sichuan)].

Pedesta masuriensis cuneomaculata MURAYAMA, 1995: 33, figs. 9, 11, HT ♂, Tuguancun (between Zhongdian and Hutiaoxia), Yunnan (LBMJ); Huang, 2003: 71, fig. 33 for ♂ genitalia, plate 3: 1 ♂, Qiqi to Dongshaofang, Nujiang, Yunnan. **syn. nov.**

Thoressa masuriensis tali, HUANG & ZHAN (2004: 179).

Specimens examined: China: Yunnan Province: 1 ♂ (CHH), Nujiang Prefecture, Gongshan County, Bingzhongluo Township, Sijitong Village, 2.VI.2002, H. HUANG leg.; 4 ♂♂ (CHH), Diqing Prefecture, Weixi County, Bai-ji-xun Township, Xiao-weixi Village, 20.VII.2004, H. HUANG leg.; 1 ♂ (LBMJ, HT of *T. masuriensis cuneomaculata*), Zhongdian County, Tuguancun Village, 24.V.1995; 3 ♂♂ (CHH), Zhongdian County, Tuguancun Village, 25.V.2004, H. HUANG leg.. Sichuan Province: 1 ♂ (CCZB), Ganzi Prefecture, Jiulong County, West slope of Gongga Mts., 23.V.2008, local collector leg.

Length of forewing: 15-15.5 mm (♂).

Remarks: 1) It is very possible that *Th. m. tali* (SWINHÖE) is independent from *Th. masuriensis* (MOORE), because the two taxa are markedly different in shape of the left footstalk and apex of the left valva in ♂ genitalia as shown by EVANS (1949), and because there is no intermediate form found between the two taxa. All the populations of *Th. m. tali* (SWINHÖE) from Sichuan and Yunnan have the yellow discal spots on upperside of forewing, whereas all the populations of *Th. masuriensis* (MOORE) from the Himalayas and Laos have the white discal spots on the upperside of forewing.

2) The type specimen originally illustrated by EVANS (1949) belongs to a form with well developed pale markings on wings, whereas the HT of *Th. m. cuneomaculata* (MURAYAMA) belongs to a form with poorly developed pale markings. The examination of more specimens from Yunnan shows that both forms can be found in the same locality and there is no difference in ♂ genitalia between them. The discal pale markings in spaces 1b and 4 on forewing can be fully developed or totally absent, the underside of hindwing can be unmarked or marked with a few pale discal spots with variable sizes in different individuals. The HT of *Th. m. cuneomaculata* (MURAYAMA) has been dissected and shares the same genital characters with all other specimens examined in this study. Thus *Th. m. cuneomaculata* (MURAYAMA) **syn. nov.** is considered as a new junior synonym of *Th. m. tali* (SWINHÖE).

Distribution: Yunnan (Dali, valleys of Yangtse River, valleys of Lancang River, valleys of Nujiang River), Sichuan (Gongga Mts.).

***Thoressa zinnia* (EVANS, 1939)**

Halpe zinnia EVANS, 1939: 165, type, ♂, Likiang (Lijiang), Yunnan (HT in ZMHB, paratypes in BMNH).

Thoressa zinnia, EVANS [1949: 255, plate 32: fig. G11-14 for ♂ genitalia, Likiang (Lijiang)].

Specimens examined: China, Yunnan Province: 3 ♂♂ (BMNH, 2 cotypes and a non-type specimen, photos examined), Lijiang, 1935, H. Hone leg..

Length of forewing: 15-16mm (♂).

Distribution: Yunnan (Lijiang).

Remarks: This species is very little known in the literature, only EVANS (1949) described very few characters in the key and published a hand-drawing of a ♂ genitalia. The photos of two cotypes in BMNH were examined by the author and one of them is published herein. This species is similar to *Th. gupta* (DE NICEVILLE) in most external features but is more in common with *Th. baileyi* (SOUTH) on the underside of wings, and is very similar to *Th. fusca* (ELWES) in ♂ genitalia but differs in the shape of gnathos. The more diagnostic characters observed from these specimens in BMNH are as follows: antennal club without pale yellow scales before apiculus; inner ciliae on upperside of both wings uniform grayish brown, outer ciliae on upperside of both wings uniform yellow, both inner and outer ciliae on underside of both wings uniform bright yellow; ♂ brand on upperside of forewing closer to wing-base than to termen and associated with two big yellow patches of scales; only upper cell spot visible on upper half of forewing cell; underside of hindwing bright brownish yellow, with yellow scales in most areas very closely distributed and forming an uniform ground color, neither powdered nor spotted, and with yellow scales in space 1b sparser and forming a darker anal area, underside of hindwing unmarked in two specimens, but with some obscure dark smudges in discal area as in the HT of *Th. pedla* (EVANS).

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Fig.1: *Thoressa yingqi* spec. nov., HT ♂, upperside (left half) and underside (right half).

Fig.2, 3: *Thoressa fusca caenis* (LEECH, 1893), ♂♂, Baoxing, Sichuan.

Fig.4: *Thoressa hyrie* (DE NICEVILLE, 1891), ♂ (HT of *Halpe lucasi merea* EVANS, 'Type// Pemako/ Mere/ 4000/ 7.6.13// W.H. Evans./ B.M.1932-274').

Figs. 5-8: *Thoressa pandita* (DE NICEVILLE, 1885), ♂♂. 5- Motuo, SE Tibet. 6- Datang, Tengchong, W. Yunnan. 7- Baihualing, Baoshan, W. Yunnan. 8- Datang, Tengchong, W. Yunnan.



Fig. 9: *Thoressa pedla* (EVANS, 1955). (9) HT ♂, 'Type// Yunnan/ 1918/ G.Forrest// M.J.Mansfield/ Coll./ B.M.1950-244// J.J. Joicey Coll. B.M. 1925-451'; (10): ♀, Lijiang, Yunnan; (11) ♂, Lijiang, Yunnan; (12) ♂, Zhongdian, Yunnan; (13) ♂, Lijiang, Yunnan. Fig. 14, 15: *Thoressa masuriensis tali* (SWINHOE, 1912). (14) ♂, Nujiang, Yunnan; (15) ♂, Lancangjiang, Yunnan. Fig. 16: *Thoressa zinnia* (EVANS, 1939), co-type ♂, 'Halpe/ Zinnia, Nov/ ♂ Cotype// Li-kiang. (China)/ Provinz Nord-Yuennan/ 1935. H. Hoene// Brit.Mus./ 1938-476'.

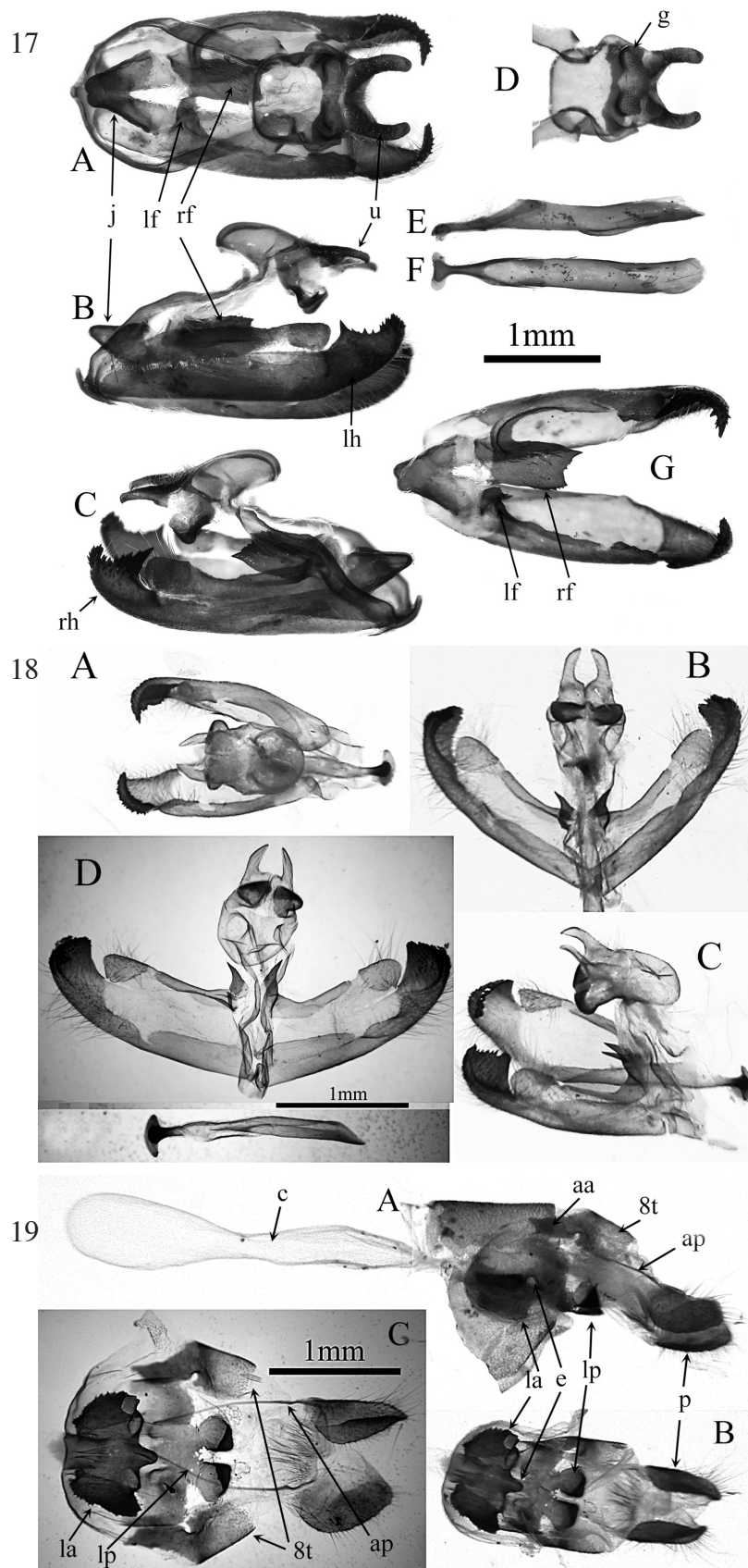


Fig. 17: *Thoressa yingqii* spec. nov., ♂ genitalia: A- Dorsal view. B- Left lateral view. C- Right lateral view. D- Tegumen, uncus and gnathos in ventral view. E- Aedeagus in lateral view. F- Aedeagus in dorsal view. G- Valvae and juxta in dorsal view with vinculum and dorsum removed. Abbreviations: j, juxta; lf, left footstalk; rf, right footstalk; u, uncus; lh, left harpe; rh, right harpe; g, gnathos.

Fig. 18: *Thoressa pedla* (EVANS, 1955), ♂ genitalia: A- Dorsal view. B- Ventral view with valvae spread. C- Dorsolateral view. D- Slide with genitalia spread and flattened.

Fig. 19: *Thoressa pedla* (EVANS, 1955), ♀ genitalia: A- Lateral view. B- Ventral view. C- Slide with genitalia spread and flattened. Abbreviations: c = corpus bursae; aa = apophysis anterioris; ap = apophysis posterioris; 8t, 8th tergum; p = papilla analis; la = lamella antevaginalis; e = entrance of ostium bursae; lp = lamella postvaginalis.

Notes on the genera *Caltoris* SWINHOE, 1893 and *Baoris* MOORE, [1881] from China

(Lepidoptera, Hesperidae)

by

HAO HUANG

received 26.I.2011

Abstract: Notes are given for Chinese species of the genera *Caltoris* SWINHOE and *Baoris* MOORE. The type specimens of the following taxa are illustrated: *Caltoris aurociliata* (ELWES & EDWARDS, 1897) (type locality: Sikkim), *Caltoris sirius* (EVANS, 1926) (type locality: Karen), *Caltoris kumara moorei* (EVANS, 1926) (type locality: Sikkim), *Caltoris bromus* LEECH, 1893 (type locality: Chia-Kou-Ho, Sichuan), *Caltoris cahira austeni* (MOORE, [1884]) (type locality: Khasi Hills), *Caltoris cahira carina* (EVANS, 1949) (type locality: Siao-Lou, Sichuan), *Caltoris cahira cahira* (MOORE, 1877) (type locality: Andamans), *Caltoris tenuis* (EVANS, 1932) (type locality: Burma), *Caltoris confusa* (EVANS, 1932) (type locality: Burma) and *Caltoris malaya* (EVANS, 1926) (type locality: Mergui). Seven species of *Caltoris* and four species of *Baoris* are recognized from Chinese continent and Hainan Island. A key to all known Chinese species is given for these two genera. The adult habitus and ♂ genitalia are illustrated for most of Chinese species except only *Caltoris tulsii* (DE NICEVILLE, 1883). Two species, *Baoris pagana* (DE NICEVILLE, 1887) and *Baoris penicillata chapmani* EVANS, 1937 are recorded as new to Chinese fauna; two species, *Caltoris aurociliata* (ELWES & EDWARDS, 1897) and *Caltoris kumara moorei* (EVANS, 1926), that were recorded by the author from Southeast Tibet and Yunnan respectively, are firstly illustrated herein. The individual variations in wing pattern and ♂ genitalia are investigated for *Baoris farri farri* (MOORE, 1878) and *Caltoris cahira austeni* (MOORE, [1884]), and two new synonyms are recognized: *Baoris longistigmata* HUANG, 1999 **syn. nov.** and *Caltoris cahira carina* (EVANS, 1949) **syn. nov.**

Introduction: The Hesperiid genera *Caltoris* SWINHOE and *Baoris* MOORE (Lepidoptera, Hesperidae: Hesperinae) are dark skippers with elongate wings and strong flying, known only from the Oriental region. They were associated with the genera *Genes* HÜBNER, *Parnara* MOORE, *Borbo* EVANS, *Pseudoborbo* LEE, *Pelopidas* WALKER, *Polytremis* MABILLE and *Iton* DE NICEVILLE in the *Gegenes* genus group by EVANS (1949) or the *Pelopidas* genus group by ELIOT (1978). According to WARREN & al. (2008), the valid tribal name for this group is Baorini DOHERTY, and this tribe is monophyletic with strong support in molecular phylogeny.

Totally 17 world species were reviewed by EVANS (1949) for *Caltoris* and five for *Baoris*, since then only one valid species, *Caltoris septentrionalis* KOIWAYA, 1996 was added from Central China. In EVANS' (1949) catalogue, only four species of *Caltoris* and two species of *Baoris* were recorded for the Chinese fauna, since then two more species (HUANG, 2000; HUANG & XUE, 2004) were newly recorded from China. In this paper two further species of *Baoris* are recorded from China. Therefore, hitherto seven species of *Caltoris* and four species of *Baoris* are known from China.

Material: A total of 85 specimens, belonging to 10 species, were examined. Most specimens from Anhui, Zhejiang, Sichuan, Yunnan and Tibet were collected by the author and preserved in the author's private collection; all the other specimens from Hainan, Fujian, Guangxi and Yunnan were collected by various authors and are preserved in the entomological collection of Institute of Zoology, Chinese Academia of Science, Beijing.

The identification was based upon EVANS' (1949) revisional work and an examination of photographs of type specimens preserved in the BMNH. To distinguish species, when possible a good number of specimens were dissected and checked for ♂ genital characters to survey the individual variations of some species in ♂ genitalia.

Terminology of wing pattern and venation follows EVANS (1949). Terminology of ♂ genitalia follows SHIROZU (1960).

The specimens examined are deposited in the following collections:

BMNH: Natural History Museum, London, U. K.

CHH: Private collection of Hao Huang, Qingdao, China

IZAS: Institute of Zoology, Chinese Academia of Science, Beijing, China

Key to Chinese species of *Caltoris* and *Baoris*

- 1 Mid tibiae heavily spined. Upperside of hindwing with black hair brush in the cell or with reddish brown hairy area in discal area, conspicuously different from the ground colour in submarginal area 2
- Mid tibiae unspined. Upperside of hindwing rather uniform in colour, without black hair brush in cell or reddish brown hairy area in discal area 5
- 2 ♂ with a black recumbent hair brush overlying a scent pouch in the cell on upperside of hindwing and correlated with a polished grey dorsal area and an oval brand on underside of forewing. Subhyaline spots on upperside of forewing white. Forewing cell spots not conjoined. Harpe of valva produced into a terminal spur at lower posterior angle. Cephalic margin of harpe on the inner wall of valva broadly serrate and produced into an inner process. Right terminal wall of phallus broad and not as an elongate process 3
- ♂ without secondary sexual characters. Subhyaline spots on upperside of forewing more or less yellow. Forewing cell spots conjoined and across cell. Harpe of valva rounded at lower posterior angle. Cephalic margin of harpe on the inner wall of valva not produced into an inner process. Right terminal wall of phallus protruded as an elongate process as well as left one *Baoris pagana*
- 3 Cell spots on upperside of forewing present. Left terminal wall of phallus protruded into an elongate process. Right terminal wall of phallus spined and with a terminal piece overturned and inserted into vesica. Saccus a little longer than half the height of ring 4

- Cell spots on upperside of forewing absent. Left terminal wall of phallus not protruded into an elongate process. Right terminal wall of phallus unspined and without a terminal piece overturned and inserted into vesica. Saccus usually not longer than half the height of ring *Baoris penicillata chapmani*
- 4 Underside of hindwing powdered by scales to form yellowish brown super-scaling. Harpe of valva shorter with a relatively smaller distance between base of inner process and distal margin. Cornuti obsolete. Spines on left terminal wall and the right terminal piece inserted into vesica relatively smaller. Phallus relatively shorter *Baoris leechii*
- Underside of hindwing with all scales very dense and forming a uniform ground colour without the powdered scales. Harpe of valva longer with a relatively larger distance between base of inner process and distal margin. Cornuti well marked as hair-tuft. Spines on left terminal wall and the right terminal piece inserted into vesica relatively larger. Phallus relatively longer *Baoris farri farri*
- 5 Forewing more or less marked with subhyaline spots. Underside of both wings without darker longitudinal streaks between veins 6
- Forewing without subhyaline spots Underside of both wings marked with darker longitudinal streaks between veins *Caltoris septentrionalis*
- 6 Underside of hindwing uniform dark brown 7
- Underside of hindwing with basal half conspicuously whitened or glossed pale purple *Caltoris tulsi*
- 7 Upperside of forewing more or less with cell spots. Uncal processes not hooked in lateral view. Gnathos not hooked upwards in lateral view. Phallus relatively broader 8
- Upperside of forewing without cell spots. Uncal processes hooked downwards in lateral view. Gnathos hooked upwards in lateral view. Phallus relatively thinner *Caltoris kumara moorei*
- 8 Uncal lobes nearly upright to tegumen, with a posterior hook pointed towards caudal end of uncus. Uncal processes very short 9
- Uncal lobes oblique to tegumen, without a hook pointed towards caudal end of uncus. Uncal processes relatively longer 10
- 9 Forewing discal spot in space 2 not closer to discal spot in space 3 than to cell spot. Antenna with 11-13 black nudum antennomeres. Ciliae bright yellow. Gnathos elongate and covering uncal processes. Ampulla not beyond dorsal process of harpe. Harpe with dorsal process reaching dorsal margin of ampulla and broadly serrate. Phallus 1.4 times as long as valva. Lateral walls of caudal end of phallus broad and not protruded into elongate process *Caltoris aurociliata*
- Forewing discal spot in space 2 closer to discal spot in space 3 than to cell spot. Antenna with 16 brown nudum antennomeres. Ciliae gray. Gnathos relatively shorter and not covering uncal processes. Ampulla well beyond dorsal process of harpe. Harpe with dorsal process below ampulla, not reaching dorsal margin of ampulla and not serrate. Phallus 1.7 times as long as valva. Lateral walls of caudal end of phallus protruded into elongate process *Caltoris sirius chimdroa*
- 10 Uncal lobes obtuse at tip and directed dorsoanteriorly. Uncal processes and gnathos expanded laterally in dorsal or ventral view. Ampulla well beyond the caudal end of harpe. Harpe rounded at lower posterior angle, not produced into an acute angle. Phallus with left terminal wall shorter than right wall, and spined on terminal ridge. Lamella postvaginalis with caudal end concave and lateral extensions stouter *Caltoris bromus bromus*
- Uncal lobes more or less pointed at tip and directed dorsally. Uncal processes and gnathos not expanded laterally in dorsal or ventral view. Ampulla extended as far as the caudal end of harpe. Harpe produced into an acute angle at lower posterior angle. Phallus with left terminal wall as long as right wall, and not spined on terminal ridge. Lamella postvaginalis with caudal end straight and lateral extensions slenderer *Caltoris cahira austeni*

Taxonomy of *Caltoris* and *Baoris* from China

Caltoris SWINHOE, 1893 (Type species: *Hesperia kumara* MOORE, 1878).

= *Milena* EVANS, 1912 (Type species: *Parnara plebeia* DE NICEVILLE, 1887).

Some species of *Caltoris* are nearly indistinguishable in wing pattern, and most of them are found in two morphological groups: one group with cell spots present and the upper cell spot not larger than the lower cell spot, comprising *Caltoris aurociliata* (ELWES & EDWARDS) (figs. 1, 2, 25, 26), *Caltoris sirius* (EVANS) (figs. 3, 4, 27, 28, 29, 30), *Caltoris cahira* (MOORE) (figs. 9-14, 33-48), *Caltoris tenuis* (EVANS) (figs. 7, 8), *Caltoris bromus* LEECH (figs. 15, 16, 49-52) and *Caltoris confusa* (EVANS) (figs. 19, 20); another group with cell spots absent, comprising *Caltoris kumara* (MOORE) (figs. 5, 6, 31, 32) and *Caltoris malaya* (EVANS) (figs. 17, 18). In EVANS' (1949) revisional work, the identification key to species in these two morphological groups is only based upon the ♂ genital characters.

In China the confusion comes from *Caltoris cahira* (MOORE) and *Caltoris bromus* LEECH, both of which are sympatric in most localities. Sometimes they can be distinguished from each other by a few characters in wing pattern, however such characters are individually variable and often useless in diagnosing the species. To distinguish them with certainty, an examination of ♂ or ♀ genitalia is always required.

1. *Caltoris aurociliata* (ELWES & EDWARDS, 1897). Type ♂, Sikkim [photos examined]. (Figs. 1, 2, 25, 26, 60, 87a, 88a.)

Specimens examined: 1 ♂ (CHH), Motuo, Southeast Tibet.

Distribution: Southeast Tibet (Motuo); Sikkim, Northeast India (Manipur, Naga Hills), North and Central Vietnam.

Important characters: Length of forewing: 21 mm. Antenna with 11-13 black nudum antennomeres. Ciliae of both wings bright yellow. Discal hairy area on upperside of hindwing dark brown. Cell spots of forewing well separated, with the upper cell spot minute and beyond the lower cell spot. Saccus nearly 1/3 times as long as height of ring. Uncal lobes nearly upright to tegumen and hooked towards caudal end of uncus. Uncal processes very short and obtuse at tip. Gnathos obtuse at tip, very long and bent upwards to cover the tip of uncal processes. Ampulla not protruded beyond the dorsal process of harpe. Harpe right-angled at lower posterior angle, with dorsal process reaching dorsal margin of ampulla, very broad and serrate at tip. Phallus nearly 1.4 times as long as valva, broader than in other species, with subzonal sheath nearly twice as long as suprazonal sheath. Opening of bulbous ejaculatorius nearer to zone than to cephalic end. Caudal end of phallus broadly and densely spined at both lateral wall and ridge, with left branch as long as right branch.

2. *Caltoris sirius chimdroa* (EVANS, 1926). Holotype ♂, Chimdro valley (now Motuo), Southeast Tibet. (Figs. 27-30, 62, 87s, 88s.)

Specimens examined: 2 ♂♂ (CHH), Motuo, Southeast Tibet.

Distribution: Southeast Tibet (Motuo).

Important characters: Length of forewing: 17 mm. Antenna with 16 dark brown nude antennomeres. Ciliae of both wings gray. Hairy discal area on upperside of hindwing greenish brown. Cell spots of forewing separated, with the upper cell spot minute and beyond the lower cell spot, sometimes absent. Saccus nearly 1/3 times as long as height of ring. Uncal lobes nearly upright and hooked towards caudal end of uncus. Uncal processes very short and obtuse at tip. Gnathos obtuse at tip. Ampulla protruded weakly, as far as the caudal end of harpe. Harpe rounded at lower posterior angle, with dorsal process well below ampulla, very short and smooth at tip. Phallus nearly 1,7 times as long as valva, thinner than in other species, with subzonal sheath nearly twice as long as suprazonal sheath. Opening of bulbus ejaculatorius markedly nearer to zone than to cephalic end. Caudal end of phallus with lateral branches strongly protruded as a pair of free processes, densely and heavily spined at both lateral wall and ridge, with left branch as long as right branch.

3. *Caltoris cahira austeni* (MOORE, [1884]). Type ♂, Khasias, Assam [photos examined]. (Figs. 9, 10, 33-48, 63-68, 70, 87c1-c5, 88c1-c5.) = *Caltoris cahira carina* (EVANS, 1937) **syn.nov.** Type ♂, Siao Lou, Sichuan [photos examined] (figs. 11, 12).

= *Caltoris cahira confuciana* (EVANS, 1937). Type ♂, Omeishan, Sichuan. Synonymised by EVANS (1949).

Specimens examined: 14 ♂♂, 1 ♀ (IZAS, CHH), Sichuan; 3 ♂♂ (IZAS), Guangxi; 2 ♂♂ (IZAS), Fujian; 5 ♂♂ (IZAS), Hainan; 1 ♂ (CHH), Nujiang, Northwest Yunnan; 3 ♂♂ (IZAS), Guangxi; 1 ♂ (IZAS), Gengma, South Yunnan.

Distribution: Sichuan, Yunnan, Guangxi, Guangdong, Hainan, Fujian, Hubei; Sikkim, Northeast India, Burma, Thailand, Laos, North and Central Vietnam, Malaya.

Important characters: Length of forewing: 16,5-19 mm. Antenna with 15-16 dark brown nude antennomeres. Ciliae of both wings pale grayish yellow. Hairy area on upperside of hindwing greenish brown. Cell spots of forewing separated, with the upper cell spot minute and beyond the lower cell spot, sometimes absent. Pale spot in space 1b usually absent, occasionally present. Saccus nearly 1/3 times as long as height of ring. Uncal lobes oblique and angled at dorsal tip. Uncal processes moderate in length and obtuse at tip. Gnathos obtuse at tip. Ampulla protruded strongly, as far as the caudal end of harpe. Harpe acutely angled at lower posterior angle, with dorsal process smooth at tip, very variable individually in width and length (figs. 63-68). Phallus nearly 1,4 times as long as valva, with subzonal sheath nearly twice as long as suprazonal sheath. Opening of bulbus ejaculatorius only a little nearer to zone than to cephalic end. Caudal end of phallus broadly and densely spined at lateral wall but not at ridge, with left branch nearly as long as right branch.

Taxonomic notes: *Caltoris cahira carina* (EVANS, 1949) was described as to be paler and larger than *C. cahira austeni* (MOORE), with a tendency for the upper cell spot to be absent and more rarely the apical and upper discal spot. *C. cahira carina* (EVANS) was originally described from West Sichuan and recorded by EVANS (1949) also from Fujian, Hubei and Yunnan. *Caltoris cahira austeni* (MOORE) was originally described from Khasias, Northeast India and recorded by EVANS (1949) also from Guangdong, Hainan, Sikkim, Assam, Burma, Siam, Indo-China and Malaya. However, as illustrated in this paper, the type specimens of *C. cahira austeni* (MOORE) and *C. cahira carina* (EVANS) are hardly distinguishable from each other. Even in such a small collection examined by the author from China, the upper cell spot, the apical and upper discal spot of forewing are always well marked in most specimens from Sichuan and all specimens from Fujian, not smaller or fewer than in specimens from Hainan or type specimen of *C. cahira austeni* (MOORE) from India. The specimens from Hainan (figs. 33, 34, 37, 38) usually have ground colour much darker than in type specimen of *C. cahira austeni* (MOORE) from India, thus could be regarded as a further subspecies in accordance with the EVANS' (1949) standard for subspecific rank. The specimens from Guangxi include both the very dark form (figs. 41, 42) and the moderate dark form (fig. 48), the specimens from Sichuan include both the moderate dark form (figs. 35, 36) and the pale form (figs. 39, 40). One specimen from Nujiang, Northwest Yunnan belongs to the very dark form (fig. 44). Therefore it is impossible to draw a geographical line to separate these forms into two subspecies. Among the specimens from Sichuan, those from higher area around the Gonggashan Mountains and Baoping sometimes have spots of forewing smaller or fewer, however those from lower area around the Qingchengshan Mountains are all in normal form as well as the specimens from other provinces in China. It is not reasonable to regard only the populations from higher area of Sichuan as a separate subspecies. In conclusion *C. cahira carina* (EVANS) **syn.nov.** is considered as a junior synonym of *C. cahira austeni* (MOORE).

4. *Caltoris bromus bromus* LEECH, 1893. Holotype ♀, Chia-Kou-Ho (now Jin-kou-he), Sichuan [photos examined]. (Figs. 15, 16, 49-52, 57-59, 87b1-b3, 88b1-b2)

Specimens examined: 3 ♂♂ (IZAS), Guanxian, Sichuan; 1 ♂ (IZAS), Yunnan; 1 ♂ (CHH), Banna, South Yunnan; 2 ♂♂ (IZAS), Fujian.

Distribution: Sichuan, Yunnan, Fujian, Zhejiang, Hong Kong; Northeast India, Burma, Laos, Vietnam, Thailand, Malaya, Sumatra, Java, Borneo, Celebes.

Important characters: Length of forewing: 18-20 mm. Antenna with 15-16 dark brown nude antennomeres. Ciliae of both wings from pale grayish yellow to dark brownish gray. Spot in space 1b usually present, sometimes absent. Saccus nearly 1/3 times as long as height of ring. Uncal lobes oblique and obtuse at tip. Uncal processes moderate in length and expanded laterally at tip. Gnathos obtuse and expanded laterally at tip. Ampulla elongate, protruded well beyond the caudal end of harpe. Harpe rounded at lower posterior angle, with dorsal process short and smooth at tip. Phallus nearly 1.5 times as long as valva, with subzonal sheath nearly 2,5 times as long as suprazonal sheath. Opening of bulbus ejaculatorius only a little nearer to zone than to cephalic end. Caudal end of phallus broadly and sparsely spined at both ridge and lateral wall, with left branch shorter than right branch.

Notes: Besides the ♂ and ♀ genital characters in the key, *C. b. bromus* LEECH sometimes can be distinguished from *C. cahira austeni* (MOORE) by the following external characters: 1) underside of hindwing sometimes with a non-hyaline spot in space 2 and sometimes in space 3 also; 2) forewing sometimes with three subapical spots whereas that of *C. cahira austeni* (MOORE) usually with two subapical spots. The larval host of *C. b. bromus* LEECH was established by YOUNG (2001) as *Phragmites karka* (Poaceae) in Hong Kong; according to HSU & WANG (2004), the larval host of *C. b. yanuca* FRUHST. was *Phragmites vallatoria*, a reed widespread in freshwater wetlands. The immature stages of *C. b. yanuca* FRUHST. were fully described by HSU & WANG (2004).

5. *Caltoris kumara moorei* (EVANS, 1926). Type ♂, Sikkim [photos examined]. (Figs. 5, 6, 31, 32, 61, 69, 87k1-k2, 88k1-k2.)

Specimens examined: 2 ♂♂ (CHH), Banna, South Yunnan.

Distribution: South Yunnan; Sikkim, India (Assam), Burma, Laos, North & Central Vietnam.

Important characters: Length of forewing: 18 mm. Antenna with 16 black nudum antennomeres. Ciliae of both wings pale grayish

yellow. Hairs on hindwing greenish brown. Cell spots of forewing totally absent. Saccus nearly 1/3 times as long as height of ring. Uncal lobes oblique and angled at dorsal tip. Uncal processes rather long and hooked downwards at tip. Gnathos pointed and hooked upwards at tip. Ampulla protruded moderately, as far as the caudal end of harpe. Harpe rounded at lower posterior angle, with dorsal process slender and smooth at tip. Phallus nearly 1.4 times as long as valva, slenderer than in other species, with subzonal sheath nearly twice as long as suprazonal sheath. Opening of bulbous ejaculatorius only a little nearer to zone than to cephalic end. Caudal end of phallus narrowly and sparsely serrate at lateral walls but not as ridges, with left branch a little shorter than right branch.

6. *Caltoris tulsii tulsii* (DE NICEVILLE, 1883). Type ♂, Sikkim.

Specimens examined: none.

Distribution: Yunnan; Bhutan, Sikkim, Northeast India, Burma, Thailand, Malaya, Laos, North & Central Vietnam.

This species is well characterized by the glossed pale purple basal area on underside of hindwing. The first record of this species for Chinese fauna was made by EVANS (1949), who recorded one pair from Yunnan. LEE (1962) also recorded this species in his list of collection made by the Academia Sinica Expeditions to Yunnan, but I failed to locate any specimen of this species in IZAS.

7. *Caltoris septentrionalis* KOIWAYA, 1996. Holotype ♂, Shaanxi. (Figs. 21-24, 70, 87se, 88se.)

Specimens examined: 1 ♂ (CHH), Banfangzi, Zhouzhi, Shaanxi; 1 ♂ (IZAS), Hubei.

Distribution: Shaanxi, Hubei.

Important characters: Length of forewing: 20-20.5 mm. Antenna with 13 black nude antennomeres. Ciliae of both wings blackish gray. Hairs on hindwing blackish gray. Upperside of both wings black and unmarked. Underside of both wings marked with longitudinal black streaks between veins. Saccus nearly half as long as height of ring. Uncal lobes oblique and a little pointed dorsoanteriorly at tip. Uncal processes moderate in length and obtuse at tip. Gnathos obtuse at tip. Ampulla not protruded beyond the dorsal process of harpe. Harpe rounded at lower posterior angle, with dorsal process stout, broadly serrate at tip and reaching dorsal margin of ampulla. Phallus nearly 1.8 times as long as valva, with subzonal sheath twice as long as suprazonal sheath. Opening of bulbous ejaculatorius much nearer to zone than to cephalic end. Caudal end of phallus narrowly spined along lateral ridges. Cornuti weakly marked.

Baoris MOORE, [1881] (Type species: *Hesperia oceia* HEWITSON, [1868])

1. *Baoris pagana* (DE NICEVILLE, 1887). Type ♂, Sikkim (figs. 53-56, 71, 89pa).

Specimens examined: 1 ♂, 1 ♀ (IZAS), Motuo, Southeast Tibet.

Distribution: Southeast Tibet; Sikkim, India, Burma, North & Central Vietnam, Laos, Thailand, Borneo.

Important characters: Length of forewing ♂: 22 mm. Antenna with 15 black nude antennomeres. Ciliae of both wings orange-brown. Upperside of hindwing without black hair tuft in cell. Basal and discal area on upperside of hindwing densely clad with bright reddish brown hairs, much paler than submarginal area of hindwing. Cell spot of forewing double, conjoined and upright to costa of forewing. Underside of forewing without pale area and brand near dorsum. Saccus very long, about 2/3 times as long as height of ring. Uncal lobes oblique to tegumen, pointed at tip and directed dorsoanteriorly. Length of forewing ♀: 23 mm. Antenna with 15 black nudum antennomeres. Wing-shape similar to that of ♂ but with dorsum of forewing longer and termen of forewing more convex. Orange ciliae restricted to tornal area of hindwing, leaving other ciliae brownish. Ground colour on both sides of both wings as in ♂. All pale spots of forewing similar to those of ♂, but a little bigger and closer to one another. An additional pale spot present in space 1b of forewing on upperside, a little inside of spot in space 2. Otherwise as in ♂.

2. *Baoris farri farri* (MOORE, 1878). Type ♀, Calcutta, India. (Figs. 72, 75, 77, 79, 82, 84, 86, 89f1-f7).

= *Baoris longistigmata* HUANG, 1999 **syn.nov.** Holotype ♂, Hekou, Southeast Yunnan [examined] (figs. 82, 89f7).

Specimens examined: 1 ♂ (IZAS, holotype of *Baoris longistigmata*), Hekou, Southeast Yunnan; 5 ♂♂ (CHH), Banna, South Yunnan; 3 ♂♂ (IZAS), Guangxi; 4 ♂♂ (IZAS), Hainan; 1 ♂ (IZAS), Wuhu, Anhui.

Distribution: Yunnan, Guangxi, Hainan, Anhui, Jiangxi, Hong Kong; India, Sikkim, Burma, Thailand, Laos, Vietnam, Malaya, Sumatra.

Important characters: Length of forewing: 19-20 mm. Antenna with 15-16 brown nude antennomeres. ♂ with brand near dorsum on underside of forewing and with black hair brush and scent pouch in cell on upperside of hindwing. Upperside of forewing with cell spots. Underside of hindwing uniform dark brown, without superscaling. Saccus about 2/3 times as long as height of ring. Harpe of valva relatively longer, with a relatively larger distance between base of inner process and distal margin. Inner process of harpe weakly protruded basad and obtuse at tip. Dorsal process of harpe relatively less marked and obtuse at tip. Lower spine of harpe relatively longer and bent upwards. Phallus nearly twice as long as valva, with subzonal sheath nearly twice as long as suprazonal sheath. Opening of bulbous ejaculatorius a little nearer to cephalic end than to zone. Left terminal wall of phallus protruded as an elongate process and heavily spined. Right terminal wall of phallus broad and spined, with a terminal piece inserted into vesica and heavily serrate at end. Cornuti remarkable and in shape of hair tuft.

Taxonomic notes: The ♂ genital characters of the holotype of *B. longistigmata* HUANG, 1999 **syn.nov.** do not run out of the individual variations of *B. farri farri* (MOORE), thus the former is considered as a junior synonym of the latter.

3. *Baoris leechii* (ELWES & EDWARDS, 1897). Type ♂, Kiu Kiang (now Jiujiang, Jiangxi) (figs. 74, 76, 78, 80, 89i1-15).

Specimens examined: 5 ♂♂ (CHH, IZAS), Sichuan; 5 ♂♂, 3 ♀♀ (CHH), Zhejiang; 3 ♂♂ (CHH), Anhui; 3 ♂♂ (CHH), Fujian.

Distribution: Sichuan, Zhejiang, Anhui, Fujian, Jiangxi, Shanghai, Shaanxi, Hunan.

Important characters: Length of forewing: 18-19 mm. Antenna with 15 brown nude antennomeres. ♂ with brand near dorsum on underside of forewing and with black hair brush and scent pouch in cell on upperside of hindwing. Upperside of forewing with cell spots. Underside of hindwing densely powdered with yellowish brown scales. Saccus about 2/3 times as long as height of ring. Harpe of valva relatively shorter, with a relatively smaller distance between base of inner process and distal margin. Inner process of harpe markedly protruded basad. Dorsal process of harpe a little pointed. Lower spine of harpe relatively shorter. Phallus nearly twice as long as valva, with subzonal sheath nearly twice as long as suprazonal sheath. Opening of bulbous ejaculatorius markedly nearer to cephalic end than to zone. Left terminal wall of phallus protruded as an elongate process and densely spined. Right terminal wall of phallus broad and spined, with a terminal piece inserted into vesica and serrate at end. Cornuti obsolete.

Notes: This species is nearly sympatric with *B. farri* (MOORE) in Anhui province of China.

4. *Baoris penicillata chapmani* EVANS, 1937. Type ♂, Thaungyin, Burma (figs. 73, 81, 83, 85, 89p1-p3).

Specimens examined: 4 ♂♂ (IZAS), Hainan.

Distribution: Hainan; Northeast India, Burma, Thailand, Laos, Vietnam, Malaya.

Important characters: Length of forewing: 18-19 mm. Antenna with 15-16 brown nude antennomeres. ♂ with brand near dorsum on underside of forewing and with black hair brush and scent pouch in cell on upperside of hindwing. Upperside of forewing without cell spots. Underside of hindwing uniform dark brown, without superscaling. Saccus about half as long as height of ring. Harpe of valva relatively longer, with a relatively larger distance between base of inner process and distal margin. Inner process of harpe pointed basad at an acute angle. Dorsal process of harpe pointed dorsoanteriorly at an acute angle. Lower spine of harpe straight and relatively longer. Phallus nearly 1.7 times as long as valva, with subzonal sheath nearly twice as long as suprazonal sheath. Opening of bulbus ejaculatorius markedly nearer to cephalic end than to zone. Left terminal wall of phallus broad and spined but not protruded into an elongate process. Right terminal wall of phallus broad and unspined, without a terminal piece inserted into vesica. Cornuti remarkable and in shape of hair tuft.

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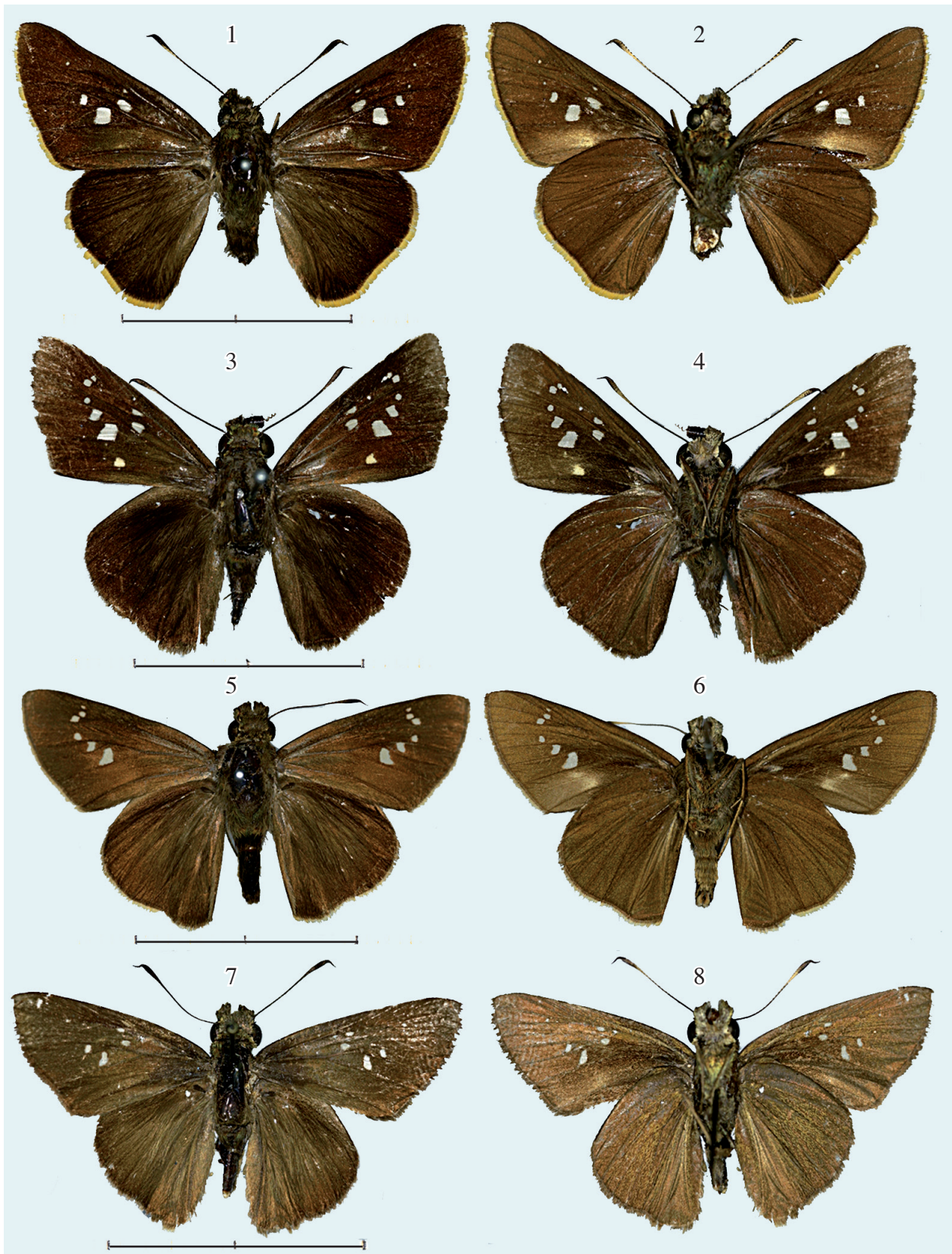


Fig. 1, 2: *Caltoris aurociliata* (ELWES & EDWARDS, 1897), type ♂, Sikkim, dorsal and ventral view.
 Fig. 3, 4: *Caltoris sirius sirius* (EVANS, 1926), type ♂, Karen, dorsal and ventral view.
 Fig. 5, 6: *Caltoris kumara moorei* (EVANS, 1926), type ♂, Sikkim, dorsal and ventral view.
 Fig. 7, 8: *Caltoris tenuis* (EVANS, 1932), type ♂, Ataran, Burma, dorsal and ventral view.



Fig. 9, 10: *Caltoris cahira austeni* (MOORE, [1884]), type ♂, Khasias, dorsal and ventral view.
 Fig. 11, 12: *Caltoris cahira carina* (EVANS, 1949), type ♂, Siao Lou, dorsal and ventral view.
 Fig. 13, 14: *Caltoris cahira cahira* (MOORE, 1877), type ♂, Andamans, dorsal and ventral view.
 Fig. 15, 16: *Caltoris bromus* LEECH, 1893, type ♀, Chia Kou Ho, dorsal and ventral view.

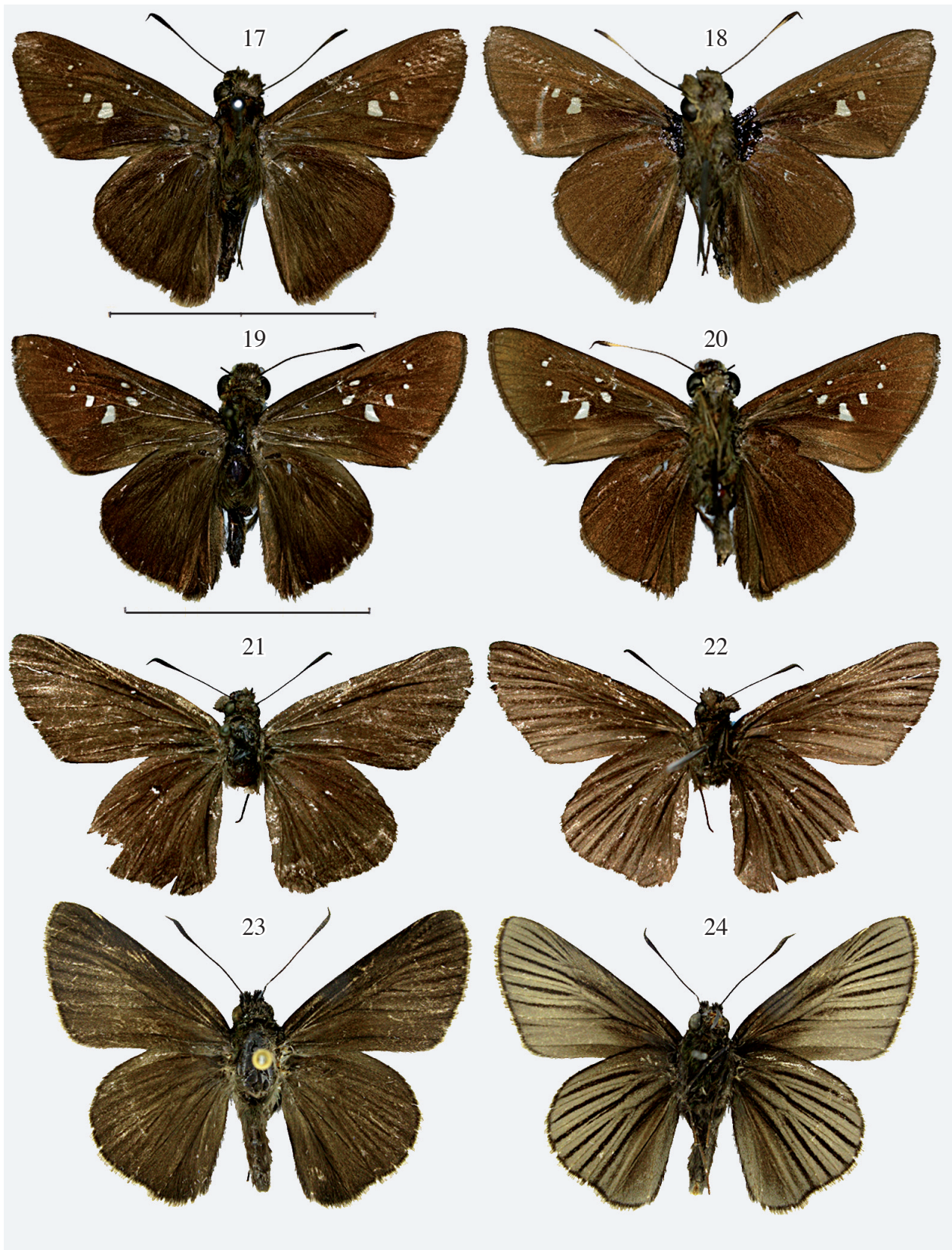


Fig. 17, 18: *Caltoris aurociliata* (ELWES & EDWARDS, 1897), type ♂, Mergui, dorsal and ventral view.
 Fig. 19, 20: *Caltoris confusa* (EVANS, 1932), dorsal view, male type, Ataran, Burma, dorsal and ventral view.
 Fig. 21, 22: *Caltoris septentrionalis* KOIWAYA, 1996, ♀, Xingshan, Hubei, dorsal and ventral view.
 Fig. 23, 24: *Caltoris septentrionalis* KOIWAYA, 1996, ♂, Qinling, Shaanxi, dorsal and ventral view.

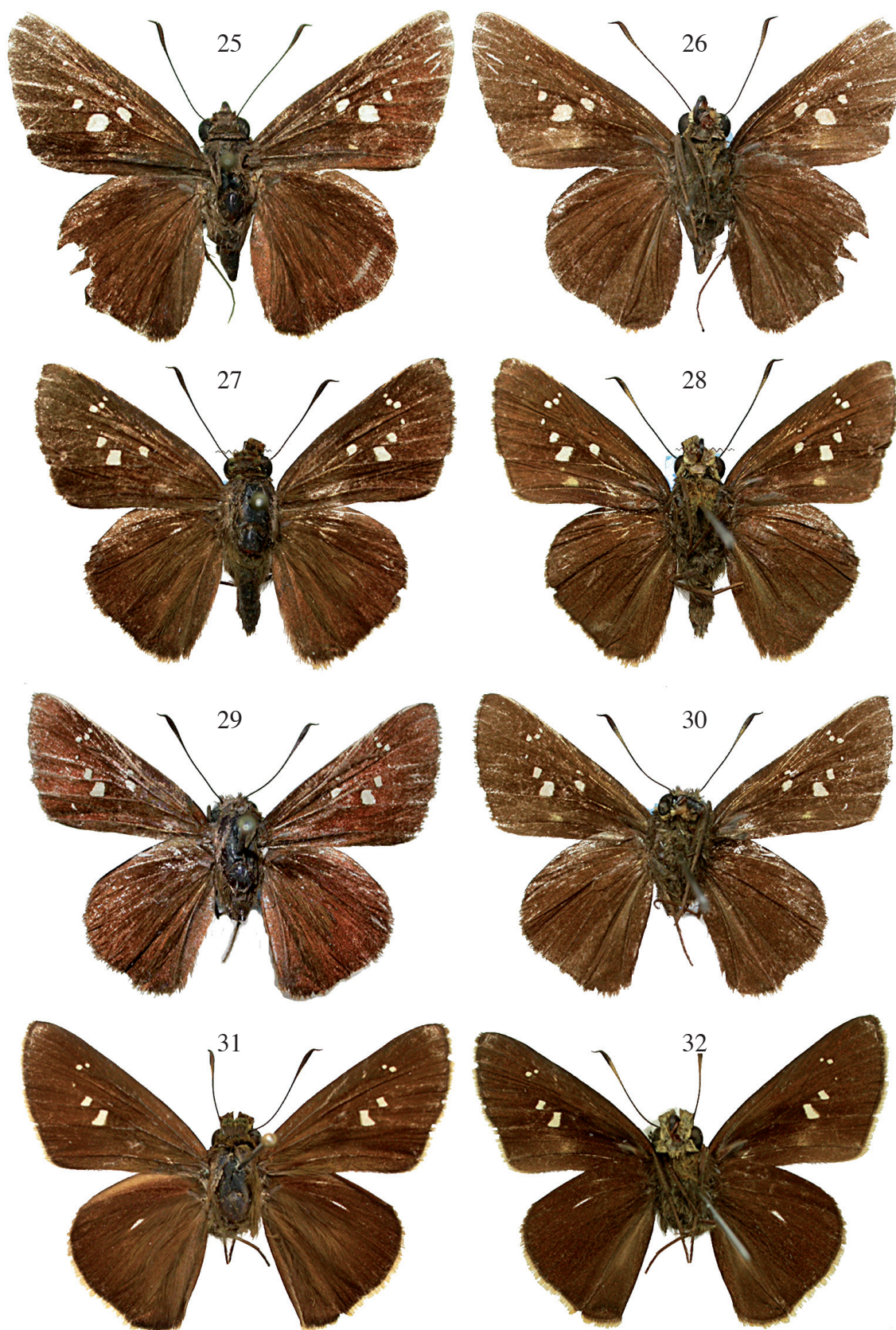


Fig. 25, 26: *Caltoris aurociliata* (ELWES & EDWARDS, 1897), ♂, Motuo, Tibet, dorsal and ventral view.
 Fig. 27, 28: *Caltoris sirius chindroa* (EVANS, 1926), ♂, Motuo, Tibet, dorsal and ventral view.
 Fig. 29, 30: *Caltoris sirius chindroa* (EVANS, 1926), ♂, Motuo, Tibet, dorsal and ventral view.
 Fig. 31, 32: *Caltoris kumara moorei* (EVANS, 1926), ♂, Banna, Yunnan, dorsal and ventral view.



Fig. 33, 34: *Caltoris cahira austeni* (MOORE, [1884]), ♂, Hainan, dorsal and ventral view.
 Fig. 35, 36: *Caltoris cahira austeni* (MOORE, [1884]), ♂, Qingchengshan, Sichuan, dorsal and ventral view.
 Fig. 37, 38: *Caltoris cahira austeni* (MOORE, [1884]), ♂, Hainan, dorsal and ventral view.
 Fig. 39, 40: *Caltoris cahira austeni* (MOORE, [1884]), ♂, Qingchengshan, Sichuan, dorsal and ventral view.

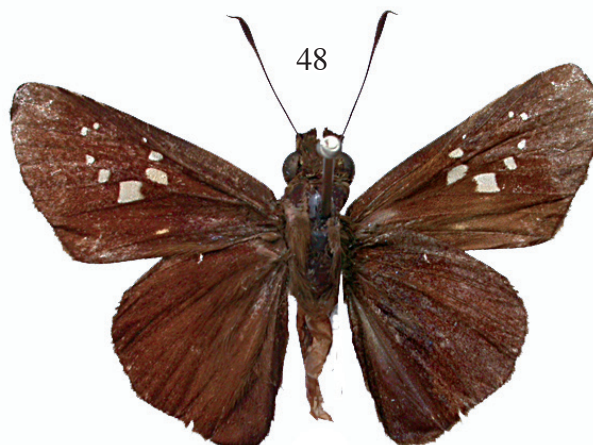
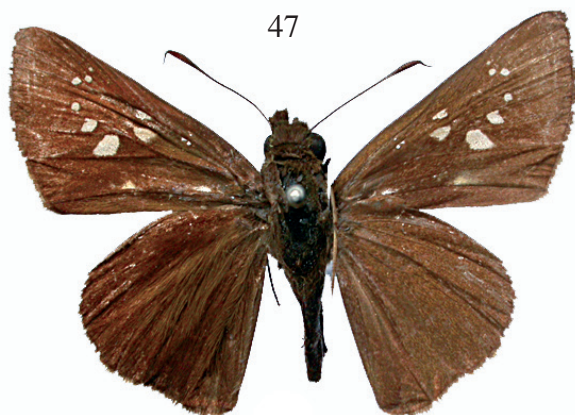
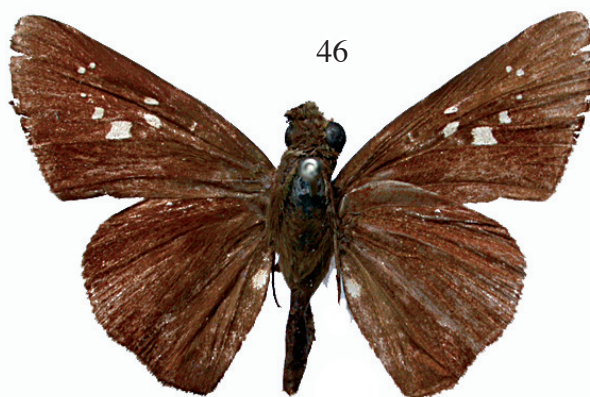
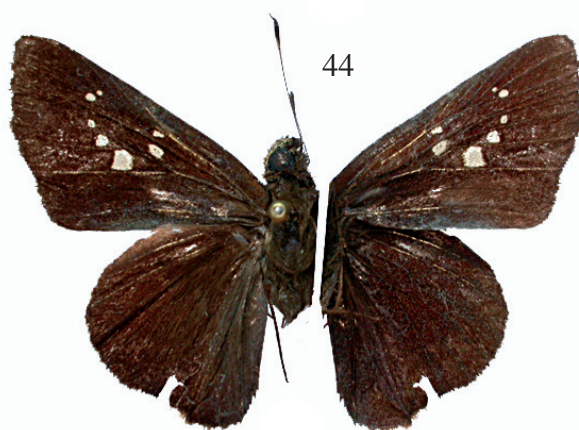
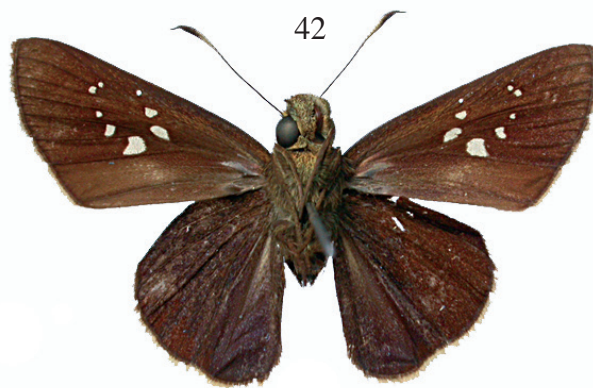
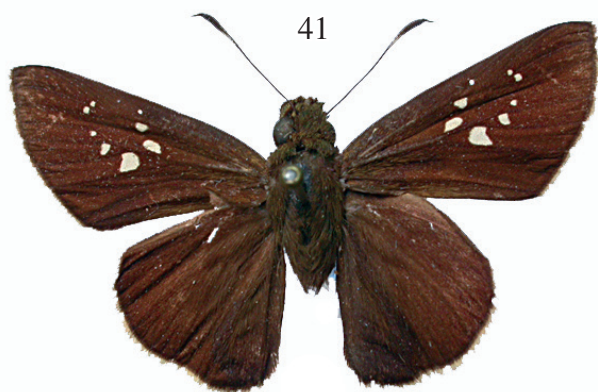


Fig. 41-48: *Caltoris cahira austeni* (MOORE, [1884])
 Fig. 41, 42: ♂, Guangxi, dorsal and ventral view.
 Fig. 43: ♂, Gengma, South Yunnan, dorsal and ventral view.
 Fig. 44: ♂, Nujiang, Yunnan, dorsal and ventral view.

Fig. 45: ♂, Fujian, dorsal and ventral view.
 Fig. 46: ♂, Fujian, dorsal and ventral view.
 Fig. 47: ♂, Sichuan, dorsal and ventral view.
 Fig. 48: ♂, Guangxi, dorsal and ventral view.

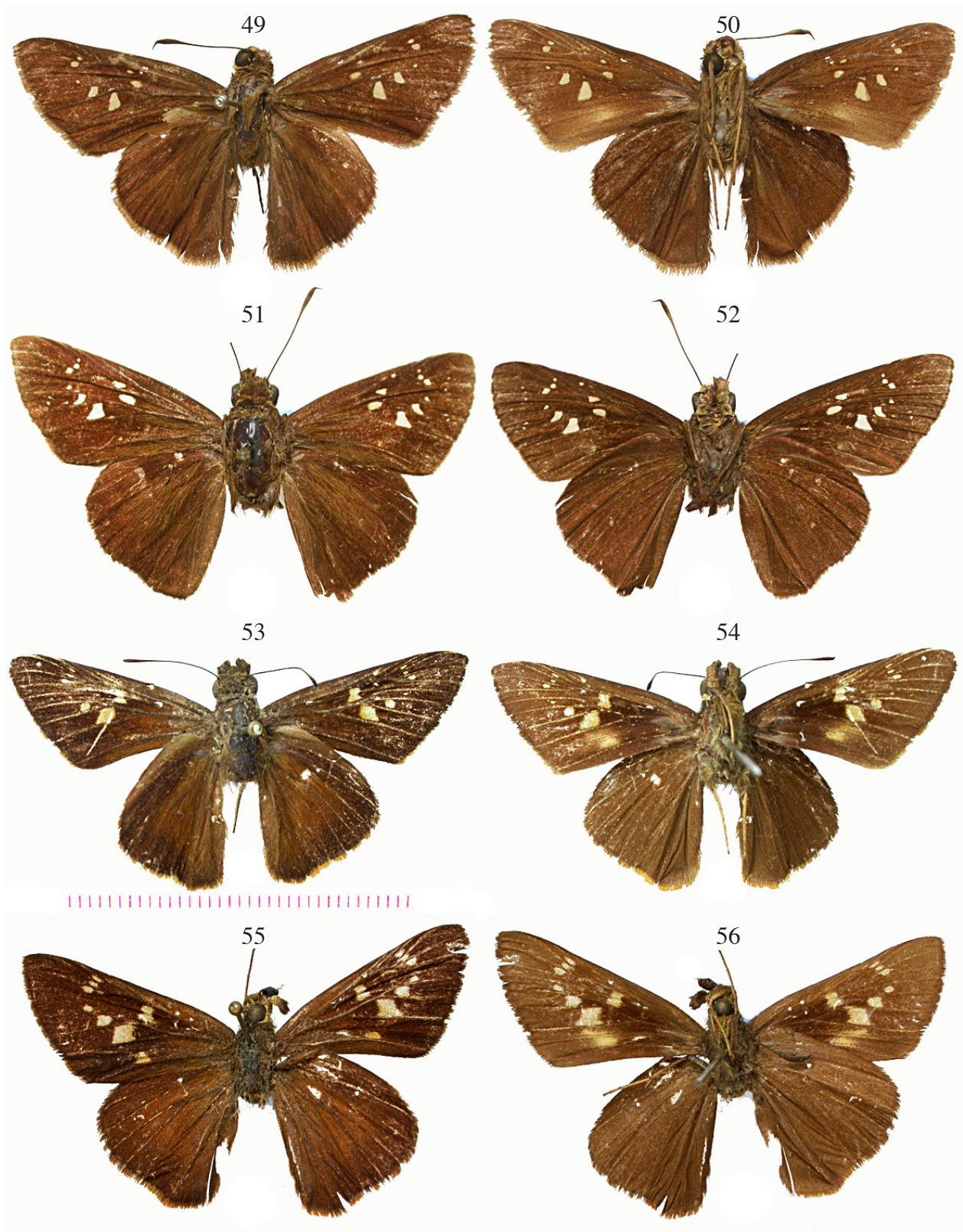


Fig. 49, 50: *Caltoris bromus bromus* LEECH, 1893, ♂, Fujian, dorsal and ventral view.

Fig. 51, 52: *Caltoris bromus bromus* LEECH, 1893, ♂, Banna, South Yunnan, dorsal and ventral view.

Fig. 53, 54: *Baoris pagana* (DE NICEVILLE, 1887), ♂, Motuo, Tibet, dorsal and ventral view.

Fig. 55, 56: *Baoris pagana* (DE NICEVILLE, 1887), ♀, Motuo, Tibet, dorsal and ventral view.

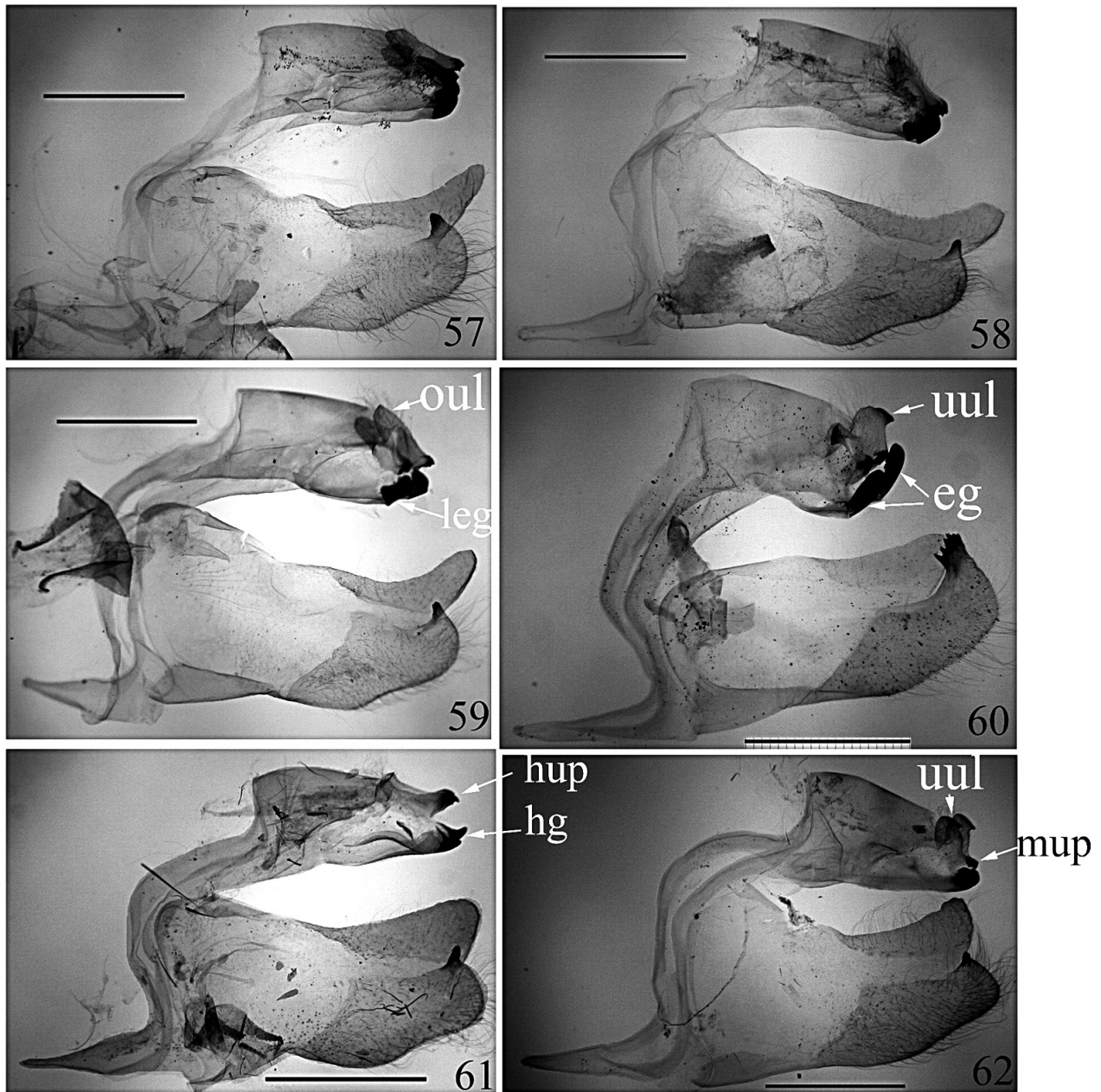


Fig. 57-62: ♂ genitalia of *Caltoris* in lateral view with left valva and phallus removed.

Fig. 57: *Caltoris bromus bromus* LEECH, 1893, Banna, South Yunnan.

Fig. 58: *Caltoris bromus bromus* LEECH, 1893, Fujian.

Fig. 59: *Caltoris bromus bromus* LEECH, 1893, Sichuan.

Fig. 60: *Caltoris aurociliata* (ELWES & EDWARDS, 1897), Motuo, Tibet.

Fig. 61: *Caltoris kumara moorei* (EVANS, 1926), Banna, South Yunnan.

Fig. 62: *Caltoris sirius chindroa* (EVANS, 1926), Motuo, Tibet.

Abbreviations: oul - oblique uncal lobe; leg - laterally expanded gnathos; uul - upright uncal lobe; eg - elongate gnathos; hup - hooked uncal process; hg - hooked gnathos; mup - minute uncal process.

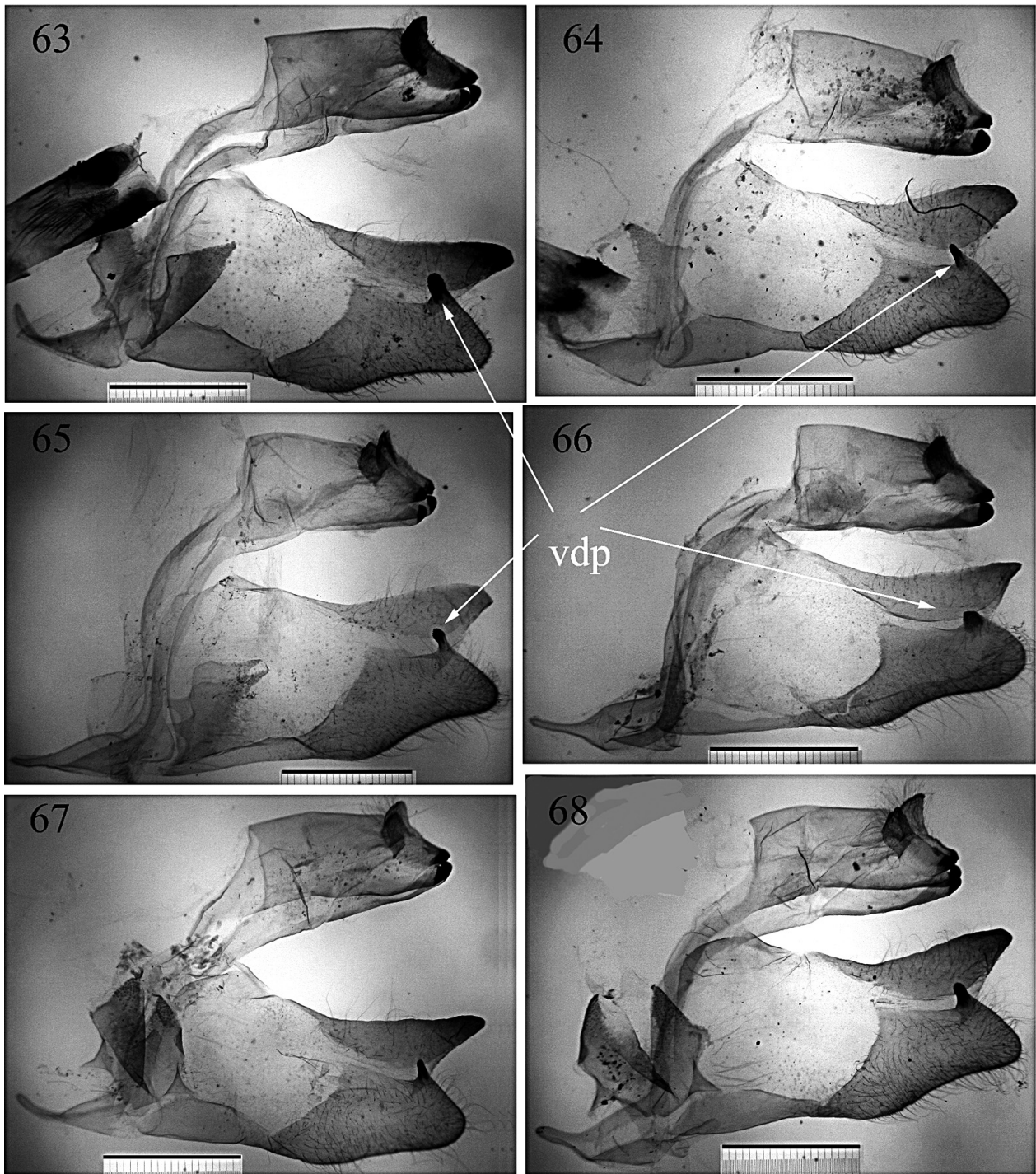


Fig. 63-68: ♂ genitalia of *Caltoris* in lateral view with left valva and phallus removed.

Fig. 63: *Caltoris cahira austeni* (MOORE, [1884]), Hainan;

Fig. 64: *Caltoris cahira austeni* (MOORE, [1884]), Guangxi;

Fig. 65: *Caltoris cahira austeni* (MOORE, [1884]), Fujian;

Fig. 66: *Caltoris cahira austeni* (MOORE, [1884]), Guangxi;

Fig. 67: *Caltoris cahira austeni* (MOORE, [1884]), Qingchengshan, Sichuan;

Fig. 68: *Caltoris cahira austeni* (MOORE, [1884]), Hainan.

Abbreviations: vdp - variable dorsal process of harpe.

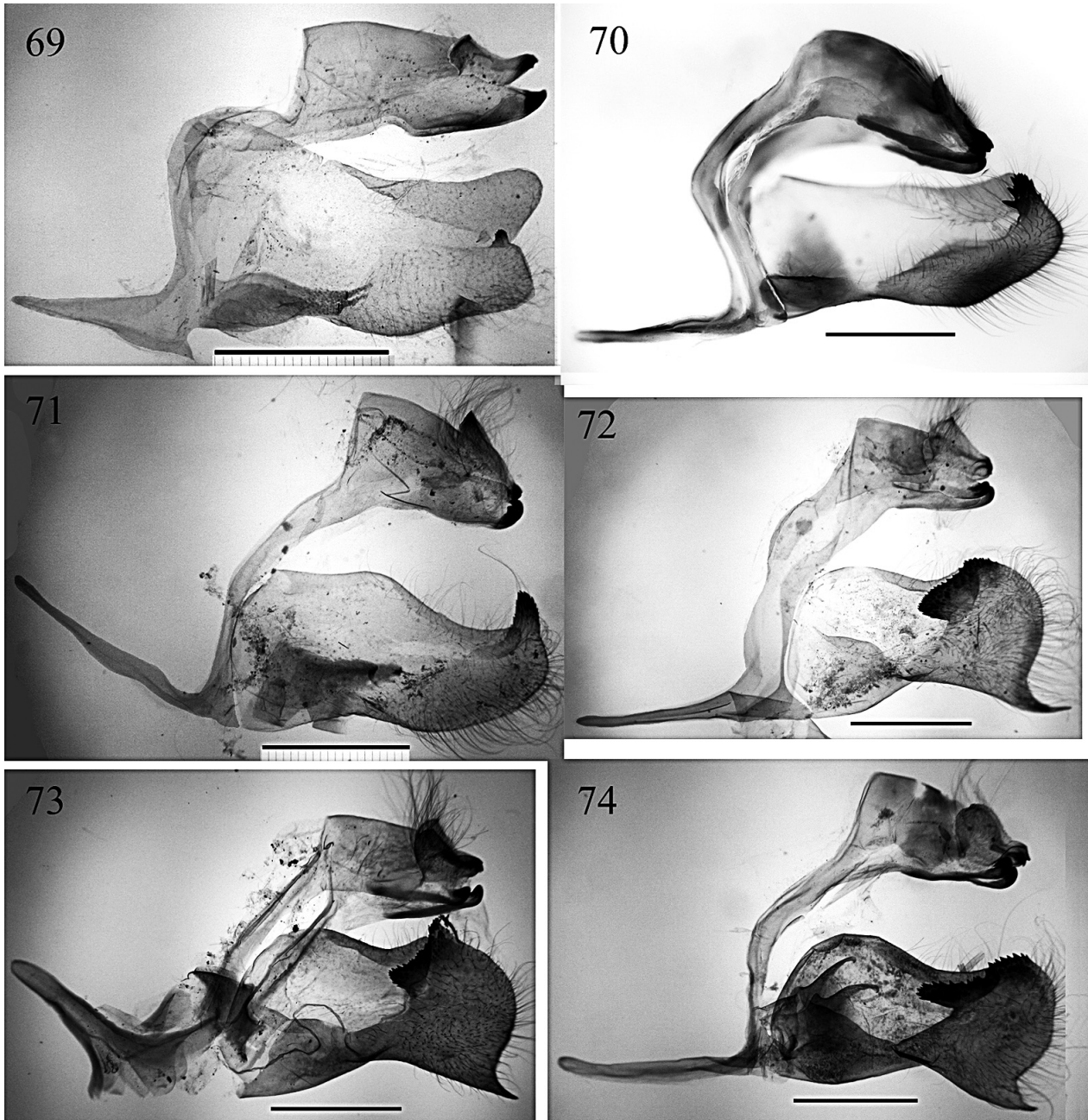


Fig. 69-74: ♂ genitalia of *Caltoris* and *Baoris* in lateral view with left valva and phallus removed.

Fig. 69: *Caltoris kumara moorei* (EVANS, 1926), Banna, South Yunnan.

Fig. 70: *Caltoris septentrionalis* KOIWAYA, 1996, Shaanxi.

Fig. 71: *Baoris pagana* (DE NICEVILLE, 1887), Motuo, Tibet.

Fig. 72: *Baoris farri farri* (MOORE, 1878), Hainan.

Fig. 73: *Baoris penicillata chapmani* EVANS, 1937, Hainan.

Fig. 74: *Baoris leechii* (ELWES & EDWARDS, 1897), Anhui.

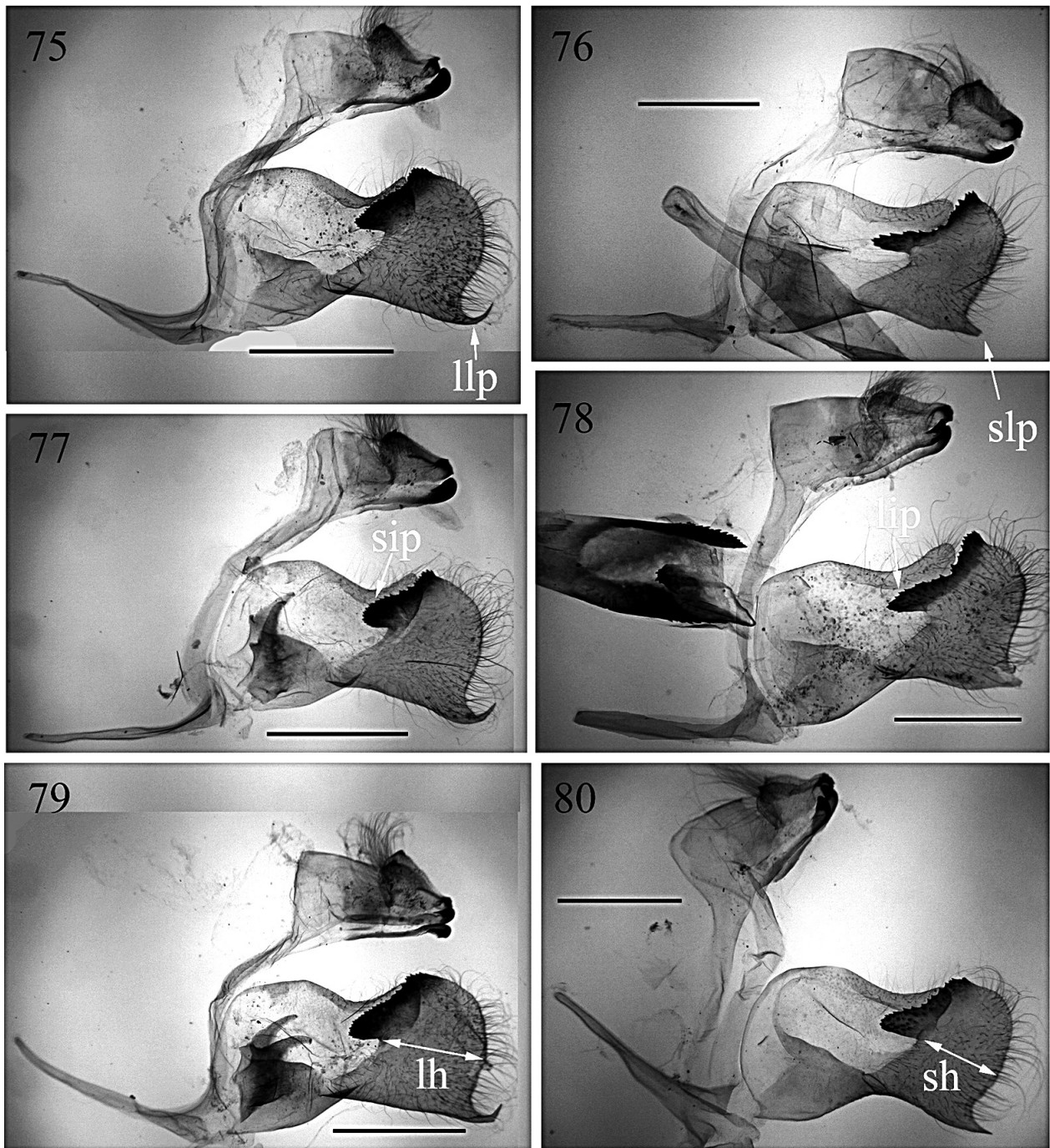


Fig. 75-80: ♂ genitalia of *Baoris* in lateral view with left valva and phallus removed.

Fig. 75: *Baoris farri farri* (MOORE, 1878), Banna, South Yunnan.

Fig. 76: *Baoris leechii* (ELWES & EDWARDS, 1897), Qingchengshan, Sichuan.

Fig. 77: *Baoris farri farri* (MOORE, 1878), Banna, South Yunnan.

Fig. 78: *Baoris leechii* (ELWES & EDWARDS, 1897), Qingchengshan, Sichuan.

Fig. 79: *Baoris farri farri* (MOORE, 1878), Banna, South Yunnan.

Fig. 80: *Baoris leechii* (ELWES & EDWARDS, 1897), Fujian.

Abbreviations: llp - longer lower process of harpe; sip - shorter inner process of harpe; slp - shorter lower process of harpe; lip - longer inner process of harpe; lh - longer harpe; sh - shorter harpe.



Fig. 81-86: ♂ genitalia of *Baoris* in lateral view with left valva and phallus removed.

Fig. 81: *Baoris penicillata chapmani* EVANS, 1937, Hainan.

Fig. 82: *Baoris farri farri* (MOORE, 1878), Hekou, South Yunnan (holotype of *Baoris longistigmata* HUANG, 1999).

Fig. 83: *Baoris penicillata chapmani* EVANS, 1937, Hainan.

Fig. 84: *Baoris farri farri* (MOORE, 1878), Wuhu, Anhui.

Fig. 85: *Baoris penicillata chapmani* EVANS, 1937, Hainan.

Fig. 86: *Baoris farri farri* (MOORE, 1878), South Yunnan.

Abbreviations: ss - shorter saccus; pdp - pointed dorsal process of harpe; cm - concaved inner margin of harpe; pip - pointed inner process of harpe; ls - longer saccus; rdp - rounded dorsal process of harpe; scm - slightly concaved inner margin of harpe; oip - obtuse inner process of harpe.

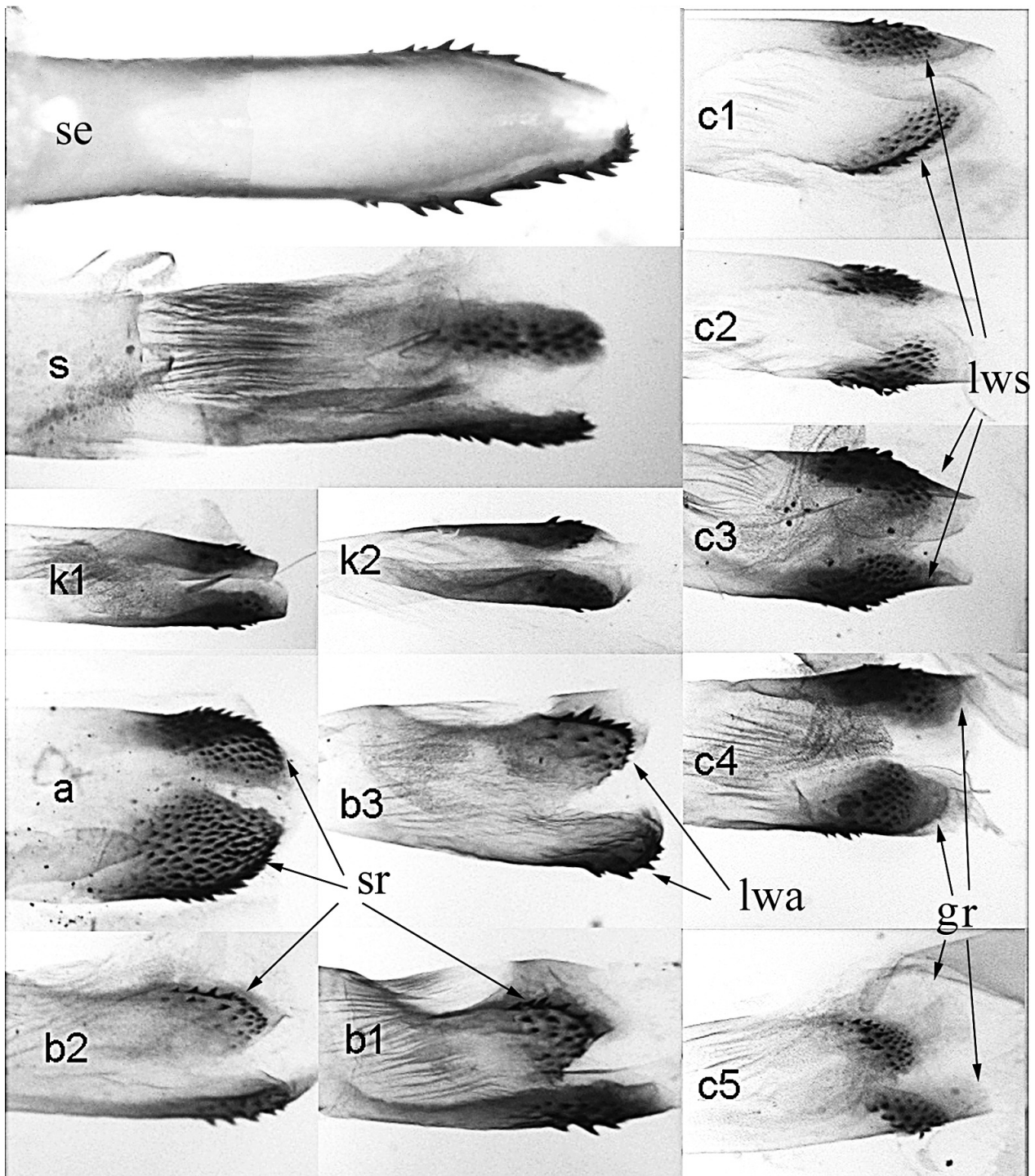


Fig. 87: Tip of phallus of *Baoris* and *Caltoris* in ventral view.

se - *Caltoris septentrionalis* KOIWAYA, 1996, Shaanxi.

s - *Caltoris sirius chindroa* (EVANS, 1926), Motuo.

k1 - *Caltoris kumara moorei* (EVANS, 1926), Banna.

k2 - *Caltoris kumara moorei* (EVANS, 1926), Banna.

a - *Caltoris aurociliata* (ELWES & EDWARDS, 1897), Motuo.

b1 - *Caltoris bromus bromus* LEECH, 1893, Sichuan.

b2 - *Caltoris bromus bromus* LEECH, 1893, Fujian.

b3 - *Caltoris bromus bromus* LEECH, 1893, Banna.

c1 - *Caltoris cahira austeni* (MOORE, [1884]), Guangxi.

c2 - *Caltoris cahira austeni* (MOORE, [1884]), Fujian.

c3 - *Caltoris cahira austeni* (MOORE, [1884]), Hainan.

c4 - *Caltoris cahira austeni* (MOORE, [1884]), Hainan.

c5 - *Caltoris cahira austeni* (MOORE, [1884]), Guangxi.

Abbreviations: sr - serrate ridge; lwa - lateral walls asymmetric in length; lws - lateral walls symmetric in length; gr - glabrous ridge.

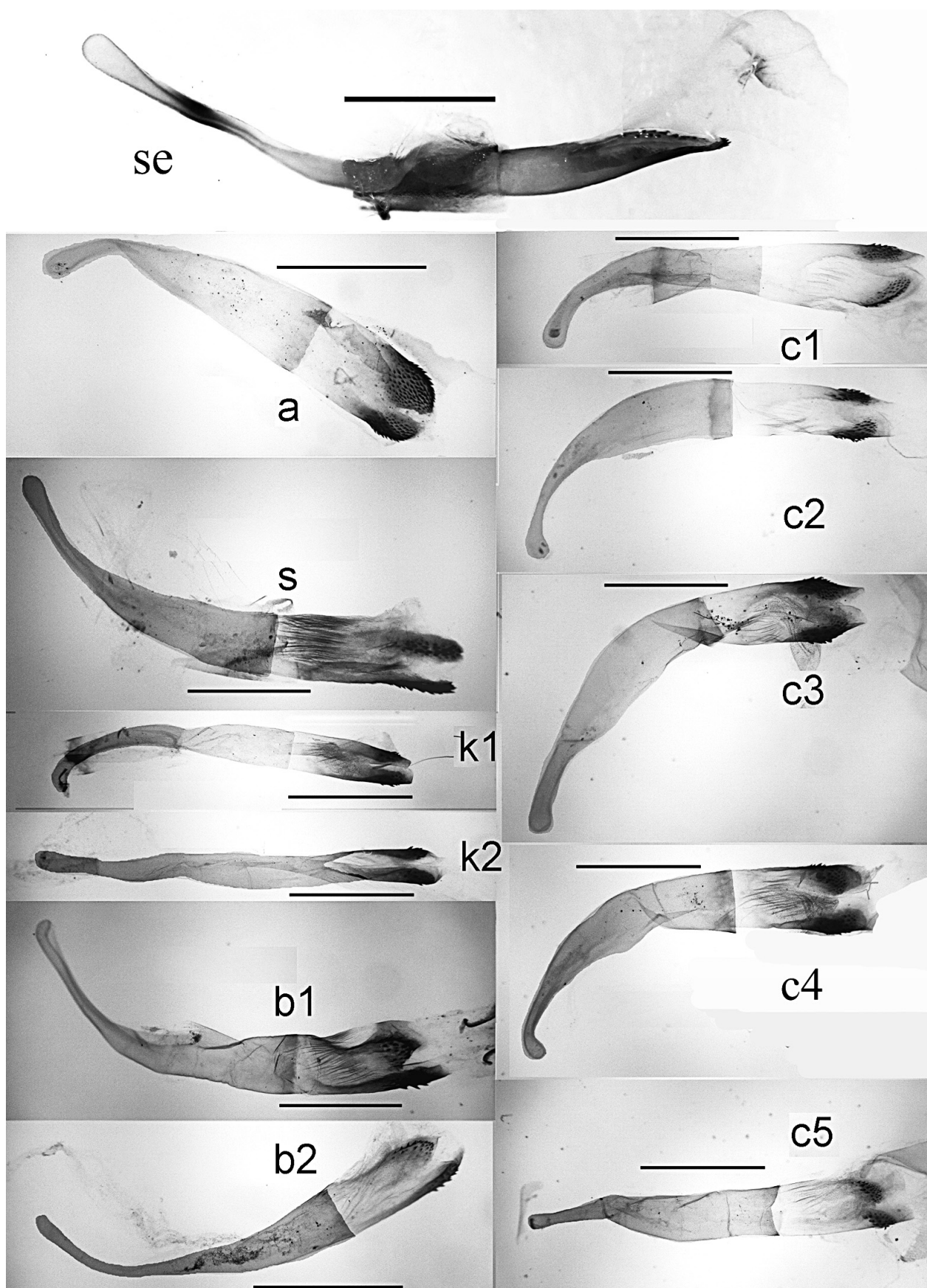


Fig 88: Phallus of *Caltoris*, mostly flattened in ventral view (scale = 1mm).

se - *Caltoris septentrionalis* KOIWAYA, 1996, Shaanxi.

a - *Caltoris aurociliata* (ELWES & EDWARDS, 1897), Motuo.

s - *Caltoris sirius chimdroa* (EVANS, 1926), Motuo.

k1 - *Caltoris kumara moorei* (EVANS, 1926), Banna.

k2 - *Caltoris kumara moorei* (EVANS, 1926), Banna.

b1 - *Caltoris bromus bromus* LEECH, 1893, Sichuan.

b2 - *Caltoris bromus bromus* LEECH, 1893, Fujian.

c1 - *Caltoris cahira austeni* (MOORE, [1884]), Guangxi.

c2 - *Caltoris cahira austeni* (MOORE, [1884]), Fujian.

c3 - *Caltoris cahira austeni* (MOORE, [1884]), Hainan.

c4 - *Caltoris cahira austeni* (MOORE, [1884]), Hainan.

c5 - *Caltoris cahira austeni* (MOORE, [1884]), Guangxi.

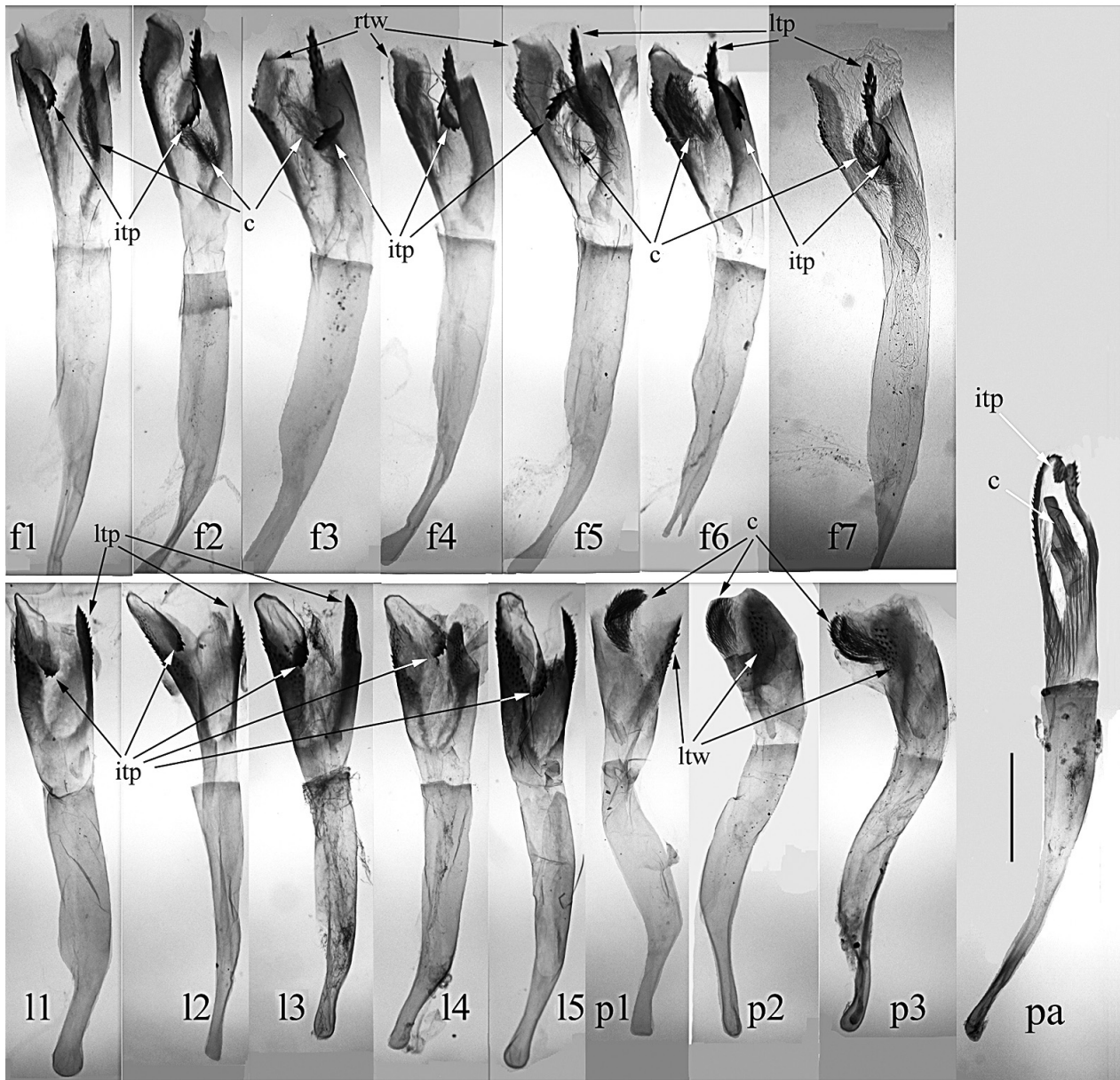


Fig. 89: Phallus of *Baoris*, mostly flattened in dorsal view (scale = 1mm).

f1 - *Baoris farri farri* (MOORE, 1878), Wuhu, Anhui.

f2 - *Baoris farri farri* (MOORE, 1878), Banna, South Yunnan.

f3 - *Baoris farri farri* (MOORE, 1878), Hainan.

f4 - *Baoris farri farri* (MOORE, 1878), Banna.

f5 - *Baoris farri farri* (MOORE, 1878), Hainan.

f6 - *Baoris farri farri* (MOORE, 1878), Banna, South Yunnan.

f7 - *Baoris farri farri* (MOORE, 1878), Hekou, South Yunnan (holotype of *Baoris longistigmata*).

pa - *Baoris pagana* (DE NICEVILLE, 1887), Motuo.

11 - *Baoris leechii* (ELWES & EDWARDS, 1897), Qingchengshan, Sichuan.

12 - *Baoris leechii* (ELWES & EDWARDS, 1897), Fujian.

13 - *Baoris leechii* (ELWES & EDWARDS, 1897), Fujian.

14 - *Baoris leechii* (ELWES & EDWARDS, 1897), Moganshan, Zhejiang.

15 - *Baoris leechii* (ELWES & EDWARDS, 1897), Anhui.

p1 - *Baoris penicillata chapmani* EVANS, 1937, Hainan.

p2 - *Baoris penicillata chapmani* EVANS, 1937 in lateral view, Hainan.

p3 - *Baoris penicillata chapmani* EVANS, 1937 in lateral view, Hainan.

Abbreviations: itp - inserted terminal piece; c - cornuti; ltp - left terminal process; rtw - right terminal wall; ltw - left terminal wall.